Government
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SESSIONAL PAPERS

VOLUME XXXIX.—PART V.

Third Session of Eleventh Legislature

OF THE

PROVINCE OF ONTARIO

SESSION 1907

TORONTO:
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ARRANGED ALPHABETICALLY.

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Agricultural Societies, Report	26	"
Archives, Report	34	"
Asylums, Report	41	"
Bee-Keepers', Report	20	*Printed.*
Births, Deaths and Marriages, Report	7	"
Chatillon *vs.* Bertrand, correspondence	73	*Not printed.*
Children, Dependent, Report	35	*Printed.*
Conmee Clauses, Report on	62	*Not printed.*
Dairymen's Association, Report	21	*Printed.*
Davis Estate, correspondence	64	*Not printed.*
Division Courts, Report	37	*Printed.*
Education, Report	12	*Printed.*
Education Department, Orders-in-Council	50	*Not printed.*
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Electric Power Commission, Report	48	"
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Essex Magistrates and Justices	54	*Not printed.*
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Factories, Report	29	*Printed.*
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Fisheries, Report	33	"
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Fruit, Report	16	*Printed.*
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Health, Report	36	*Printed.*
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Hospitals, Charities and Refuges, Report	43	"
Hydro-Electric Power Commission, Report	48	"
Industries, Report	28	*Printed.*
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LIST OF SESSIONAL PAPERS.

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No. 2.. Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature 25th January, 1907. *Not printed.* Estimates for the service of the Province, until the Estimates for the year are finally passed. Presented to the Legislature 14th February, 1907. *Not printed.* Estimates for the year 1907. Presented to the Legislature, 26th February, 1907. *Printed.* Estimates (Supplementary). for the year 1907. Presented to the Legislature, 9th April, 1907. *Printed.* Estimates (Supplementary), for the year 1907. Presented to the Legislature, 15th April, 1907. *Printed.*

No. 3.. Report of the Minister of Lands, Forests and Mines for the year 1906. Presented to the Legislature 14th February, 1907. *Printed.*

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No. 4.. Report of the Bureau of Mines for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 5.. Report of the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*

No. 6.. Report of the Minister of Public Works for the year 1906. Presented to the Legislature, 8th March, 1907. *Printed.*

No. 7.. Report relating to the Registration of Births, Marriages and Deaths during the year 1906. Presented to the Legislature, 30th January, 1907. *Printed.*

No. 8.. Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1906. Presented to the Legislature, 15th March, 1907. *Printed.*

No. 9.. Report of the Ontario Railway and Municipal Board, for the year 1906. Presented to the Legislature, 31st January, 1907. *Printed.*

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No. 10. . Report of the Inspector of Insurance for the year 1906. Presented to the Legislature, 30th March, 1907. *Printed.*

No. 11. . Loan Corporations, Statements by Building Societies, Loan and other Companies, for the year 1906. Presented to the Legislature, 7th March, 1907. *Printed.*

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No. 12. . Report of the Minister of Education, for the year 1906, with the Statistics of 1905. Presented to the Legislature, 27th February, 1907. *Printed.*

No. 13. . Auditors' Report to the Board of Governors University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1906. Presented to the Legislature, 30th January, 1907. *Printed.*

No. 14. . Report of the Ontario Agricultural College and Experimental Farm, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

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No. 16. . Report of the Fruit Growers' Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 17. . Report of the Fruit Experimental Stations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 18. . Report of the Vegetable Growers' Association for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 19. . Report of the Entomological Society, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 20. . Report of the Bee-Keepers' Association of the Province, for the year 1906. Presented to the Legislature 21st March, 1907. *Printed.*

No. 21. . Report of the Dairymen's Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 22. . Report of the Live Stock Associations of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

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No. 24. . Report of Women's Institutes of the Province, for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*

No. 25. . Report of the Farmers' Institutes of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 26. . Report of Agricultural Societies of the Province (Fairs and Exhibitions), for the year 1906. Presented to the Legislature, 19th February, 1907. *Printed.*

No. 27. . Reports of the Horticultural Societies of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No, 28. . Report of the Bureau of Industries of the Province, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 29. . Report of the Inspectors of Factories for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 30. . Report of the Bureau of Labour for the year 1906. Presented to the Legislature, 11th March, 1907. *Printed.*

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No. 32. . Report of the Ontario Game Commission, for the year 1906. Presented to the Legislature, 19th March, 1907. *Printed.*

No. 33. . Report of the Department of Fisheries, for the year 1905. Presented to the Legislature, 8th March, 1907. *Printed.*

No. 34. . Report upon the Archives of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 35. . Report of Work relating to Neglected and Dependent Children of Ontario, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

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No. 36. . Report of the Provincial Board of Health, for the year 1906. Presented to the Legislature, 30th January, 1906. *Printed*

No. 37. . Report of the Inspector of Division Courts, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 38. . Report of the Inspector of Legal Offices, for the year 1906. Presented to the Legislature, 22nd February, 1907. *Printed.*

No. 39. . Report of the Inspector of Registry Offices, for the year 1906. Presented to the Legislature, 12th April, 1907. *Printed.*

No. 40. . Report of the Secretary and Registrar of the Province, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 41. . Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

No. 42. . Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 11th March, 1907. *Printed.*

No. 43. . Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1906. Presented to the Legislature, 12th February, 1907. *Printed.*

No. 44. . Report upon the Operation of Liquor License Acts, for the year 1906. Presented to the Legislature, 20th March, 1907. *Printed.*

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No 45. . Report of the Provincial Municipal Auditor, for the year 1906. Presented to the Legislature, 1st February, 1907. *Printed.*

No. 46. . Supplementary Return from the Record of the several Elections in the Electoral Divisions of Cardwell, Hamilton East, West Middlesex and Carleton, since the General Elections on January 25th, 1905, shewing: (1) The number of Votes Polled for each Candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of votes polled in each District; (4) The number of votes remaining unpolled; (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last Census. Presented to the Legislature, 24th January and 12th April, 1907. *Printed.*

No. 47. . Report upon the state of the Library. Presented to the Legislature, 2nd January, 1907. *Not printed.*

No. 48. . Report of the Hydro-Electric Power Commission of the Province, for the year 1906. Presented to the Legislature, 12th April 1907. *Printed.*

No. 49. . Report, with the evidence, of the Text-book Commission. Presented to the Legislature, 1st February, 1907. *Printed.*

No. 50. . Copies of Orders-in-Council, under section 27, of the Act respecting the Department of Education. Presented to the Legislature, 11th February, 1907. *Not printed.*

No. 51.. Return to an Order of the House of the sixteenth day of March, 1906, for a Return shewing the names of all License Inspectors appointed since the first day of February, 1905, together with their addresses and the dates of their appointment; the business or occupation of each Inspector prior to his appointment and the present occupation or business, other than their official business, of each such Inspector. Presented to the Legislature, 11th February, 1907. Mr. *McMillan*. *Not printed.*

No. 52.. Return to an Order of the House, of the thirtieth day of January 1907, for a Return giving the following information regarding the Toronto Electric Light Company, Limited. 1. Date of incorporation. 2. Applicants for Incorporation. 3. Objects of the Company. 4. Names of the Provisional Directors. 5. Amount of Capital. 6. Increase of Capital Stock. 7. Names of the Directors and Shareholders of the Company, according to the last Return to the Government. Presented to the Legislature, 11th February, 1907. Mr. *Hoyle*. *Not printed.*

No. 53.. Return to an Order of the House of the nineteenth day of February, 1907, for a Return of copies of all correspondence between the Government, or any member or official thereof, and any other person or persons, with reference to the dismissal of James Gillespie, of Picton, from the office of Sheriff of the County of Prince Edward. Presented to the Legislature, 26th February, 1907, Mr. *Currie*. *Not printed.*

No. 54.. Return to an Order of the House of the seventh day of February, 1907, for a Return shewing:—(1) List of names of Police Magistrates and Justices of the Peace in and for the County of Essex, on the 31st January, 1905. (2) List of names of Police Magistrates and Justices of the Peace in and for the County of Essex, appointed since February 1st, 1905. (3) Names of those who have qualified as Police Magistrates, or Justices of the Peace, in the County of Essex. Presented to the Legislature, 27th February, 1907. Mr. *Auld*. *Not printed.*

No. 55.. Return of all Fees received by the Master of Titles under Rule 77 of the Land Titles Act, for the year 1906. Presented to the Legislature, 5th March, 1907. *Not printed.*

No. 56.. Copies of Orders-in-Council commuting the Fees payable to His Honour Judge Finkle and increasing the commutations paid to His Honour Judge Benson, His Honour Judge McDonald, His Honour Judge Hardy and His Honour Judge Snider, under Section 187 of the Judicature Act and Subsection 2 of Section 84 of the Surrogate Courts Act. Presented to the Legislature, 5th March, 1907. *Not printed.*

No. 57.. Return to an Order of the House of the thirteenth day of February, 1907, for a Return shewing the various kinds of Patents issued to Locatees on St. Joseph Island. Presented to the Legislature, 5th March, 1907. Mr. *Smith* (*Sault Ste. Marie*). *Not printed.*

No. 58. . Return to an Order of the House of the twenty-fifth day of February, 1907, for a Return shewing all Estates now unsettled upon which Succession Duty was claimed by the Treasury Department where the due date was on or before the first day of January, 1905, and the estimated amount of duty due and the reasons why unsettled. Presented to the Legislature, 7th March, 1907. Mr. *Kerr* *Not printed.*

No. 59. . Return to an Order of the House of the eighth day of March, 1907, for a Return shewing the amounts credited to the cities, towns, villages and organized townships in the Province of Ontario, from the sum received under Section 2, Subsection 5, of the Supplementary Revenue Act, 1899, as amended from time to time, and also the amount charged against each such city, town, village or organized township, respectively, for the maintenance of inmates of lunatic or other asylums in the Province under the provisions of Subsection 2, of Section 4, of Chapter 9 of the Statutes of 1906. Presented to the Legislature, 11th March, 1907. Mr. *Hislop.* *Not printed.*

No. 60 . Statement shewing cash expenditure on construction of the Temiskaming and Northern Ontario Railway, as of December 31st, 1906. Presented to the Legislature, 14th March, 1907. *Printed.*

No. 61. . Return to an Order of the House of the sixth day of March, 1907, for a Return of:—1. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the cancellation or granting of a liquor license to the Palace Hotel, at Fort Frances. 2. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the cancellation or granting of a liquor license to one Thomas Wilson, at Fort Frances 3. Copies of all correspondence between the Government, or any Member or Official thereof and any person or persons, relating to the resignation or dismissal of the License Inspector or any member of the Board of License Commissioners at Fort Frances. Presented to the Legislature, 20th March, 1907. Mr *McDougal.* *Not printed.*

No. 62. . Report of the Ontario Railway and Municipal Board upon certain Bills amending the Municipal Act *in re* the Conmee clauses, referred to the Board by the Standing Committee on Municipal Law, in the Session of 1906 Presented to the Legislature, 19th March, 1907. *Not printed.*

No. 63. . Report upon the Feeble-minded in Ontario. Presented to the Legisture, 15th April, 1907. *Printed.*

No. 64. . Return to an Order of the House of the eighth day of March, 1907. for a Return of copies of all correspondence and papers relating to or in the matter of the protest of Mr. Chisholm Livingstone and the Davis Estate, against the purchase price awarded them by the arbitrators for their property for the Queen Victoria Niagara Falls Park. Presented to the Legislature, 20th March, 1907. Mr. *Fraser.* *Not printed.*

No. 65. . Report upon the Horse Industry of Ontario, for the year 1906. Presented to the Legislature, 21st March, 1907. *Printed.*

No. 66. . Return to an Order of the House, of the first day of March, 1907, for a Return shewing the number of Mining Companies incorporated in the year 1906, also total amount paid into the Treasury Department from incorporation of Mining Companies in 1906, including licenses to companies previously incorporated. Presented to the Legislature, 21st March, 1907. Mr. *Pearce. Not printed.*

No. 67. . Return to an Order of the House, of the twenty-seventh day of February, 1906, for a Return shewing, according to Counties—1. How many persons held Commissions and were qualified as Justices of the Peace, within the Province, on the 7th day of February, 1905. 2. How many persons held Commissions on the 7th day of February, 1906. 3. How many persons were included in the General Commission of the Peace, issued by the present Government. 4. How many of the persons named in such General Commission were continued in office from previous Commissions. Presented to the Legislature, 21st March, 1907. Mr. *Ross. Not printed.*

No. 68. . Return to an Order of the House, of the seventh day of February, 1907, for a Return shewing:—1. The names of Counties which have adopted the "Alternative Method" of selecting Jurors under the Amendment of 1902 to the Jurors' Act. 2. For a Comparative Statement shewing the expenses incurred under the old and new system in said Counties from the years 1902 to 1906, both inclusive. 3. The Counties (if any) in which the "Alternative Method" has been repealed and have returned to the old system of selecting Jurors. Presented to the Legislature, 22nd March, 1907. Mr. *Hoyle. Not printed.*

No. 69. Return to an Order of the House, of the sixth day of March, 1907, for a Return of copies of all correspondence between the Government and the Northumberland-Durham Power Company, with respect to a lease of water power at Healey Falls. Presented to the Legislature, 3rd April, 1907. Mr. *Pense. Not printed.*

No. 70. . Return to an Order of the House, of the seventh day of February, 1907, for a Return, shewing the number and names of the settlers located in the Township of Gaudette and Hodgins in the District of Algoma, since the year 1906. Presented to the Legislature, 5th April, 1907. Mr. *Smith (Sault Ste. Marie). Not printed.*

No. 71. . Documents and correspondence regarding Petawawa Camp. Presented to the Legislature, 15th April, 1907. *Printed.*

No. 72. . Statement of distribution of Revised and Sessional Statutes. Presented to the Legislature, 17th April, 1907. *Not printed.*

No. 73. . Copy of a letter from His Honour A Constantineau, Judge of the Counties of Prescott and Russell, addressed to the Attorney-General of Ontario in the matter of the case Chatillon *vs.* Bertrand. Presented to the Legislature, 18th April, 1907. *Not printed.*

No. 74. . Return to an Order of the House of the twenty-second day of March, 1907, for a return of copies of all correspondence between the Nipissing Mines Company, or any Official thereof and the Government, or any Member thereof, relating to the property, or title thereto, of the said company, or any part or or parcel thereof situated in the Cobalt District; or to any application relating to the same; its title, or to the operation of the mines of the company, made by or on behalf of the company, or any of its Directors or Officers. Presented to the Legislature, 18th April, 1907. Mr. *McMillan, Not printed.*

Twenty-eighth Annual Report

of the

Ontario Agricultural and Experimental Union

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1907

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honorable William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it please your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1906.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1907.

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MEMBERS FOR 1906-1907.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now about 4,800.

Adams, C., Summerland, B.C.
Aldwinckle, E., O.A.C., Guelph.
Allan, F. W., Churchill.
Allen, R. J., O.A.C., Guelph.
Allison, J. B., Leavings, Alta.
Angle, P. E., Fork's Road.
Archibald, E., Ailsa Craig.
Arkell, H. S., St. Anne de Bellevue, Que.
Armstrong, C., Havana, Cuba.
Armstrong, P., Jermyn.
Arnold, J H.., Easton's Cors.
Augustine, H., Burnaby.
Austin, H. S., Lynn Valley.

Bailey, C. F. Peterboro.
Baillie, W., Guelph.
Baker, J., Solina.
Ballantyne, P. M., Lacombe, Alta.
Ballantyne, N. M., Stratford.
Ballantyne, R., Sebringville.
Barlow, B., O.A.C., Guelph.
Barnet, W. A., Living Springs.
Beaupre, F. C., Simcoe.
Bell, H. G., Ames, Iowa.
Bell, G. R., Glanford Sta.
Bethune, Dr., O.A.C., Guelph.
Bingeman, G. W., Bloomingdale.
Binnie, T. H., Bunessan.
Boddy, R. A., Toronto.
Bose, H. N., O.A.C., Guelph.
Bowes, L. A., Strathnairn.
Bowman, Wm., Georgetown.
Bowman, E., Kault, B.C.
Bray, R. N., Nashville.
Breckon, W. D., Bronte.
Brethour, J. E., Burford.
Brodie, G. A., Bethesda.
Brokovski, A. J., Battleford, Sask.
Broome, A. H. S., Hersham, Eng.
Brown, N. E., Pineville, Pa.
Brown, W. A., Meaford.
Brown, W. J., Toronto.
Brownridge, J. W., Hornby.
Buchanan, J., O.A.C., Guelph.
Buchanan, D., Florence.
Bunting. T. G., St. Catharines.
Burns, J. H., St. Marys.
Butler, G. C., Hatfield Pevrel, Eng.

Caesar, L., Mono Rd.
Campbell, D. E., North Bruce.
Campbell, M. A., Zimmerman.
Campbell, A. D., Strathroy.
Campbell, J. A., Lawrence Sta.
Campbell, W. W., Hartford, Conn.
Campbell, J. A., Simcoe.
Canby, F., Burnaby.
Carleton, J. A., Avening.
Carlaw, Geo., Warkworth.
Carpenter, J. F., Fruitland.
Channon, G. C., Oakwood.
Christie, H. R., Amherst, N.S.
Clark, A., O.A.C., Guelph.
Clark, G. H., Ottawa.
Clarke, E. E., Meaford.
Clifford, L. G., Orrville.
Coben, H., Kinmount.
Coglon, M., Bath.
Coke, E. F., O.A.C., Guelph.
Collins, G. W., O.A.C., Guelph.
Cooley, R. B., Cannifton.
Cooper, H. S., Toronto.
Crawford, E. A., O.A.C., Guelph.
Crealy, J. E., Westmount, Que.
Creelman, G. C., O.A.C., Guelph.
Crow, J. W., O.A.C., Guelph.
Cunningham, G. C., Oil Springs.
Curran, G. B., Orillia.
Cutler, G. H., Birnam.

Day, W. H., O.A.C., Guelph.
Day, G. E., O.A.C., Guelph.
Deachman, R. J., Calgary, Alta.
Dean, H. H., O.A.C., Guelph.
Dennis, F. H., Ealing, London.
Dennis, Jas. R., Weston, Ont.
Dewar, W. R. Grahamstown, Cape Colony.
Diaz, G., O.A.C., Guelph.
Diaz, P., Ferrol, Spain.
Douglas, D., O.A.C., Guelph.
Dowling, J. E., Buenos Ayres, S. A.
Drury, E. C., Crown Hill.
Duff, H. C., Dobbinton.
Duffy, C., Nauwigewauk, N.B.
Dunlop, J. S., St. Catharines.
Duthie, Jas., Hartney, Man.

Eastham, J. W., O.A.C., Guelph.
Edwards, S. F., O.A.C., Guelph.
Edwards, W. E. J., Balsam.
Elton, Cecil, Cowley, Alta.
Emigh, C., Holbrook.
Esmond, C. W., Winnipeg, Man.
Evans, J., O.A.C., Guelph.
Evans, L., Lawrence Sta.
Everest, C. F., O.A.C., Guelph.

Fairbairn, J. B., O.A.C., Guelph.
Fairweather, F. H., Alma.
Farley, W. J., Trenton.
Farlinger, W. K., Morrisburg.
Fawcett, C. F., Upper Sackville, N.B.
Ferguson, Jas., Dalmeny.
Fife, Robt., Laurel.
Foster, K. A., Abernethy, Sask.
Foster, N., Toronto.
French, P. E., Vernon, B.C.
Friar, G. M., Shediac, N.B.
Fulmer, H. L., O.A.C., Guelph.

Gamble, W. P., O.A.C., Guelph.

Gilmour, J. D., Doe Lake.
Goble, F., Woodstock.
Gorell, G. H., Gore Bay.
Graesser, F., Guelph.
Graham, W. R., O.A.C., Guelph.
Green, R. J., Toronto.
Grisdale, J. H., C.E.F., Ottawa.
Groh, H., Preston.
Gunn, Wm. H., Toronto.
Gunn, R. E., Beaverton.

Hall, J. S., Weissenburg.
Hamer, R. S., Toronto.
Hankinson, L. D., Grovesend.
Harcourt, R., O.A.C., Guelph.
Hare, J. H., Cobourg.
Harkness, A. D., Irena.
Harries, J. T., O.A.C., Guelph.
Harris, W., Effingham.
Hartman, W. J., Woodbridge.
Hawke, A. H., Drinkwater, Sask.
Hayles, N. A. D., Tapleytown.
Hebert, G., St. Albert, Alta.
Henderson, T. B., Edmonton, Alta.
Heurtley, E. W., O.A.C., Guelph.
Hibberd, G., New Windsor, Md.
Hodgins, E. L., Portage du Fort, Que.
Hodson, R. W., Toronto.
Holtermann, R. F., Brantford.
Horton, D. H., North Pelham.
Howes, A. W., Harriston.
Howitt, J. E., O.A.C., Guelph.
Houser, H. W., Campden.
Hoy, B., South Swansee, Mass.
Hudson, H. F., O.A.C., Guelph.
Hunt, Wm., O.A.C., Guelph.
Hutt, H. L., O.A.C., Guelph.
Hutton, G. H., Lacombe, Alta.

Irvine, W. C., Habermehl.
Iwanami, J., O.A.C., Guelph.

Jackson, W. D., Fulton.
Jacobs, W. S., Toronto.
James, J. L., O.A.C., Guelph.
Jarvis, C. D., Storrs, Conn.
Jarvis, T. D., O.A.C., Guelph.
Jewson, J. E., Stone Quarry.
Johnson, D. M., Toronto, Ont.
Jones, D. H., O.A.C., Guelph.
Jordan, H. A., Windsor.
Jull, M. A., Burford.

Kennedy, W. A., Apple Hill.
Ker, J. H., St. George.
Kerr, Wm., Bronson.
Kewley, H. D., Sarnia.
King, J. H., Smith's Creek, N.B.
Kitchen, E., St. George.
Kitchen, A. F., St. George.
Klinck, C., O.A.C., Guelph.
Klinck, L., St. Anne de Bellevue, Que.
Knauss, H. L., Detroit, Mich.
Knight, G. E., Sardis, B.C.
Knopf, A. E., Montreal, Que.

Laird, J. O., Blenheim.
La Pierre, L. A., Paris.
Laughland, J., Hartney, Man.
Law, J. F., Solina.
Lawrence, C. A., Stratford.
Le Drew, H. H., O.A.C., Guelph.
Le Lacheur, G., O.A.C., Guelph.
Leslie, F. B., Esquesing.
Lewes, H. S., Summerland, B.C.
Lewis, J. M., Knoxville, Ill.
Lewis, F. G., Toronto.
Lewis, E., Westbrook Mills, N.S.
Lloyd-Jones, J. G., O.A.C., Guelph.
Logan, F. M., Victoria, B.C.

McCalla, Geo., St. Catharines.
McCallum, J. M., Shakespeare.
McCarthy, D. J., Kingston.
McCready, S. B., O.A.C., Guelph.
McDiarmid, H. S., Fingal.
MacDonald, W. T., Stillwater, Okla.
McDonald, J. C., Montreal, Que.
McEwen, C. F., Byron.
McGill, H. W., Everett.
McGrath, G. F., Easton's Cors.
McKenney, A., Corinth.
McKenzie, D. A., Queen Hill.
McKenzie, N. D., Galt.
McLaren, A., O.A.C., Guelph.
McLaren, P. S., McGarry.
McLennan, A. H., Trafalgar.
McMeans, A., O.A.C., Guelph.
McRae, D. E., Cumberland.
McVannel, A. P., St. Marys.

Mallory, F. R., Frankford.
Manton, G., Eglinton.
Marsh, G. F., Guelph.
Mason, A., O.A.C., Guelph.
Metcalfe, I. F., Burford.
Middleton, W. A., Vernon, B.C.
Millen, F. E., O.A.C., Guelph.
Miller, N. E., Creek Bank.
Miller, H. H., Calgary, Alta.
Mills, R. N., O.A.C., Guelph.
Mills, P. G., Sussex, N.B.
Monteith, Hon. N., Toronto.
Mooney, J. A., Valley River, Man.
Moore, R. R., Norwich.
Moorhouse, L. A., Stillwater, Okla.
Moorehouse, R., Cairo.
More, Jas., Kirkton.
Morrison, G. F., Hartney, Man.
Munroe, W. A., Edmonton, Alta.
Murray, C., Avening.
Murray, J. K., Avening.
Murray, Browne O., O.A.C., Guelph.

Newhall, W. H. F., Toledo, Ohio.
Newman, L. H., Ottawa.
Newton, J. N., Limehouse.
Neville, S. J., Cottonwood, Sask.
Nicholson, C., Mt. Forest.
Nixon, C. C., St. George.

Oliver, D. M., Toronto.
Ormiston, W. S., Columbus.
Owen, W. C., Thornton.
Owen, W. H., Hull, Eng.

Packard, R., Brockton, Mass.
Palmer, W. E., Marshville.
Palmer, B. G., Norwich.
Partridge, A. W., Crown Hill.
Patch, A. M. W., O.A.C., Guelph.
Peart, H. S., Jordan Harbor.
Peer, W. M., Freeman.
Petrie, C. M., Guelph.
Pipes, A. S., Moose Jaw, Sask.
Potter, W. F., Manotick.
Prittie, R. D., Moosomin, Sask.
Putnam, G. A., Toronto.

Ralph, C. H., O.A.C., Guelph.
Raynor, T. G., Ottawa.
Reed, F. H., Georgetown.
Reed, Percy, Georgetown.
Reek, W. R., Romney.
Revell, K., Walkerton.
Reynolds, J. B., O.A.C., Guelph.
Rive, H., Dundalk.
Robertson, W. H., Barrington Passage, N.S.
Robertson, C. L., O.A.C., Guelph.
Robertson, G. A., St. Catharines.
Robinson, J. D., Washington, D.C.
Rose, D. M., O.A.C., Guelph.
Ross, J. G., Montreal, Que.
Rowe, Chas. A., Langhorne, Pa.
Ryan, W., O.A.C., Guelph.

Sager, J. L., St. George.
Salkeld, D. G., Goderich.
Sanders, G. E., Roundhill, N.S.
Scott, H. W., Lancaster.
Shantz, A., Waterloo.
Shield, G., Mount Pleasant.
Shopland, N. J., Goderich.
Shuh, C. H., Waterloo.
Singleton, W., O.A.C., Guelph.
Sirett, H., Rosseau.
Slater, A. E., O.A.C., Guelph.
Slater, J. A., Galt.
Smith, A. S., Chesterville.
Smith, L., Braemar.
Smith, R. B., Columbus.
Smye, G. C., Ayr.
Spencer, J. B., Ottawa, Ont.
Springer, S., O.A.C., Guelph.
Squirrell, Wm., O.A.C., Guelph.
Squirrell, W. J., O.A.C., Guelph.
Stafford, E., Toronto.
Steele, W. D., Toronto.
Stewart, W. F., Strath Gartney, P.E.I.
Stott, L., Wyevale.
Stratton, R. W., O.A.C., Guelph.
Strong, W., O.A.C., Guelph.

Taylor, G., O.A.C., Guelph.
Taylor, S., Todmorden.
Taylor, F., Cumberland Mills, Que.
Taylor, W. R., Smithville.
Templer, Wm., Jerseyville.
Thom, C. C., O.A.C., Guelph.
Treherne, R. C., O.A.C., Guelph.
Tucker, H. S., Chapman.
Turney, A. G., O.A.C., Guelph.
Tweltridge, T. H., O.A.C., Guelph
Twigg, C. B. ,O.A.C., Guelph.

Waddell, W. M., Strathroy.
Walker, Wm., O.A.C., Guelph.
Walker, R. A., North Bay.
Ware, J. T., Allenburg.
Warren, F. B., Gamebridge.
Weaver, J. H., Westfield, N.Y.
Webster, H. B., Science Hill.
Webster, F. E., Creemore.
Weekes, H. M., Glencoe.
Wells, E. A., Chilliwack, B.C.
Westover, C. A., Frelighsburg, Que
Weylie, D. B., Glanford Sta.
Wheaton, R. R., Thorndale.
Wheeler, H. C., Hubbard, Ohio.
Whetter, W. E., Lorneville.
White, G. G., O.A.C., Guelph.
Whiteside, A. E., O.A.C., Guelph
Wiancko, T. A., Sardis, B.C.
Wiancko, A. T., Lafayette, Ind
Widdicombe, J., Grimsby.
Wilkinson, R. J., Cambray.
Williams, M. L., Sunderland.
Wilson, S., Rolling Dam N.B.
Wilson, A. C., Aurora, Ill.
Wilson, E. E., Caledon.
Winslow, R. M., Chelsea Green, London.
Wolverton, H. A., Brandon, Man.
Woods, Jno., Jordan Harbor.

Zavitz, C. A., O.A.C., Guelph.
Zavitz, E. J., O.A.C., Guelph.
Zavitz, H. V., Coldstream.

THE ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

OFFICERS FOR 1906-1907.

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Secretary and Editor ..... C. A. ZAVITZ, Agricultural College, Guelph.
Assistant Secretary ..... J. BUCHANAN, Agricultural College, Guelph.
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Auditors ..... H. S. ARKELL and R. W. HODSON.

COMMITTEES ON EXPERIMENTAL WORK.

Agriculture ..... Prof. C. A. ZAVITZ (Director), J. BUCHANAN, W. J. SQUIRRELL, A. E. WHITESIDE and H. G. BELL.
Horticulture ..... Prof. H. L. HUTT (Director), H. S. PEART and J. W. CROWE.
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Apiculture ..... R. F. HOLTERMANN (Director), E. M. HUSBAND and C. C. NIXON.

The Ontario Agricultural and Experimental Union.

ANNUAL MEETING.

The twenty-eighth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday and Wednesday, December 10th, 11th and 12th.

The President of the Union, Mr. G. A. Robertson, St. Catharines, Ont., presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the annual banquet on Tuesday evening.

SECRETARY'S REPORT.

In December of last year Prof. Zavitz was granted leave of absence from duty for the whole of the year 1906, and at the last annual meeting of the Union the writer was appointed Assistant Secretary, and asked to undertake the Secretary's duties during the latter's absence. This work has been conscientiously performed, and while some difficulties have been encountered, on the whole it has been a pleasant and decidedly interesting task, and the experience has been worth much.

Agricultural experiments were first undertaken in a systematic way by members of the Union in 1886. In that year there were only 12 experimenters, but since that time the work has gradually extended until in 1906 in the division of Agriculture alone we have experimenters in every county and district in the Province, numbering in all about 3,700.

In 1894 the co-operative work was extended so as to include Horticultural as well as Agricultural experiments, and in the spring of that year, fruit bushes, etc., were distributed to quite a number of persons for tests on their own farms. This branch of the work has also made steady growth, and 1,150 lots of experimental material were distributed in 1906.

In recent years experiments in Agricultural Chemistry, Farm Forestry, and Poultry Raising have also been undertaken, and in these lines some very good work is now being done.

In 1906 material for co-operative experiments was furnished to about 4,700 farmers in all, but this does not include all of the men engaged in the work. In the division of Horticulture there are many experiments, such as those with bush fruits, which run through a number of years, so that while only 1,150 received material in the spring of 1906, there were about 2,000 actually engaged in experimental work during the year. In the division of agriculture there are also a number of men, conducting experiments with grass and clover crops, who received the seeds a year or two ago. Taking all of these into consideration, we have a total of about 5,700 persons conducting co-operative experiments under the direction of the Union in 1906. Surely this is a vast and important work.

It should be remembered that not all of the men receiving seeds, etc., are equally well qualified for conducting experiments. Some indeed meet with complete failure for one or more years, but many of these are earnest and persistent, and some become very careful and successful experimenters after a few years' experience; and just here is where the greatest value of the work becomes evident.

A large and interesting volume might be made of the comments, suggestions, and words of commendation offered by those who have been successful experimenters; and of the criticisms and excuses of those who have failed. All of these are helpful in showing the directors where changes and improvements may be made in the system of operation.

During the year a number of letters have been received from college and experiment station workers in the United States, which show that the work of the Union is being recognized and its value appreciated on the other side of the line. President R. W. Sylvester of the Maryland Agricultural College, writes as follows:—

"I regard the Experimental Union work as the medium of the closest proximity that any Agricultural College has had to those whom they were called into existence to serve. I have watched your work very closely, and trust that in time we may have an awakening of a similar character in the United States."

It is gratifying to be able to report another very successful year's work, but let us not indulge over much in self congratulation. Let us rather look forward humbly, but hopefully and persistently, to better and greater things in the future.

TREASURER'S REPORT 1906.

Receipts.		Expenditure.	
Balance from 1905	$263 40	Agricultural experiments	$1,172 12
Membership fees	199 00	Horticultural experiments	807 52
Government grant	2,500 00	Chemical experiments	49 58
		Poultry experiments	43 00
		Part expenses annual meeting, 1905	30 00
		Part expenses annual meeting, 1906	95 00
		Meeting of executive	3 45
		Balance due on Panton memorial	31 25
		Interest on money borrowed...	1 00
		Total	$2,232 92
		Balance on hand	729 48
Total	$2,962 40		$2,962 40

We undersigned auditors, declare that we have examined the treasurer's accounts and found them correct.

December 8th, 1906.

H. S. Arkell,
R. W. Hodson,
Auditors.

PRESIDENT'S ADDRESS.

By Mr. G. A. Robertson, St. Catharines.

Assembled here on the twenty-eighth anniversary of the establishment of the Ontario Agricultural and Experimental Union, we are apt to forget about the commencement of the Association, the development and steady growth since its start, and the advances made in the different branches of

agricultural work in this country in the past few years. Permit me, therefore, to touch on some of these points of past history which some of us may have forgotten, and which still others present know very little about.

In the year 1870, Hon. John Sanfield Macdonald introduced a bill into the Ontario House of Parliament, having for its object the establishment of an Agricultural College. In 1871 a farm was purchased at Mimico, and the Rev. W. F. Clarke was appointed to visit the Agricultural Colleges in the several States of the American Union, and report as to a suitable plan to pursue in reference to the proposed college. A commission was appointed to examine the Mimico farm, and this commission advised the Government to sell it. In 1873 the present farm was bought from F. W. Stone, and a commission of good practical farmers was appointed to report on the best means of adapting the farm to the desired purposes. That commission reported that it recommended the name to be The Ontario Agricultural College and Experimental Farm, that the object of the institution should be to give a thorough training in the theory and the practice of Agriculture and of Horticulture, and that owing to the lack of information obtainable at that time the Government would have to go ahead and to learn by experience. I shall not here mention what that "learn by experience" proved to be. The institution certainly had its ups and downs, but principally downs at first.

In 1884, on the advice of our former President, Dr. Mills, Farmers' Institutes were established. This was a recognition of the necessity of a closer intercourse between the students, the College, and the farmer, and the excellent results of this movement were never more apparent than at the present time.

In the year 1880 the Ontario Agricultural and Experimental Union was formed. The objects of this association were to form a bond of union amongst the officers, students and ex-students of the Ontario Agricultural College, to promote their intercourse with a view to mutual information, to discuss subjects bearing on the wide field of agriculture with its allied sciences and arts, to conduct experiments in this field, in union as far as possible, or by individual efforts, to secure the co-operation of the agriculturists of the country in the work, and to meet at least once a year to hear papers read and addresses delivered by competent parties, and to report upon the labor of the past year. The officers and students of whatever time were eligible to become members upon the payment of the annual fee, and these were eligible to hold office and discuss questions before the association.

In 1884 the Presidents of the Agricultural Societies were made honorary members of the Union, and their presence and advice were of much benefit.

In 1886 the members of the Union started the first co-operative experimental work on their own farms; the nature of the experiments was to test the effect of salt, land plaster or gypsum, and superphosphate on wheat, oats and barley. The results of the experiments cannot be summarized here. The experiments were carried on in different parts of Ontario and on different soils which had been manured differently. The results were of special benefit to the individual experimenters.

In 1887 attention was also given to the advisability of the co-operative testing of varieties of grain, grasses, etc., which had already given high results in the tests at the College. By the introduction of these new or improved varieties there has been a great increase in the quantity and the quality of the products of the farm. Many of our standard varieties now

in general cultivation throughout the Province were brought to the homes of the farmers through this phase of the Experimental Union work.

To-day the Experimental department of the College is taking great care in getting improved strains of the best varieties by a method of plant selection and of saving the seed from the plants of the most desirable types. By this process the department is enabled to strengthen the straw of certain varieties of grain, to develop the rust resisting powers of the straw, to increase the yield of grain, and in some cases to hasten the time of maturity. The Experimental department at the College is also busy in the work of hybridization, or of combining the good qualities of some of the best standard varieties in the origination of new grains, as, for example, in the crossing of a heavy yielding variety of wheat such as Dawson's Golden Chaff with a superior milling wheat as Turkey Red or Imperial Amber, and thus trying to originate new varieties which will to a certain extent retain the yielding powers of the former with the better milling qualities of the latter.

As soon as these improved strains, and also the new varieties, have proven themselves to possess superior excellence, and have been produced in sufficient quantities, they will be distributed throughout this Province for further test through the medium of the Experimental Union.

We may call attention to the experiments in horticulture which were started a number of years ago. Some of the standard varieties of strawberries, raspberries, currants, gooseberries, etc., were distributed to farms in the various parts of the Province, and accurate accounts kept from year to year of their yield, hardiness, quality, and dates of maturity. These experiments have done much towards creating an interest among farmers outside of the fruit districts proper, in the possibilities of growing small fruits, and have furnished statistics regarding the adaptability of certain varieties to certain districts. We are hoping that this work will be extended still further. Some time since, the Union received a communication from Mr. R. H. Cowley, inspector of Public Schools for the County of Carleton, who has since been appointed Inspector of Continuation Classes of the Public Schools. He asks from the Union that some thirty or more Rural Schools be allowed to co-operate in the fruit testing experiments. I will quote his words, "Our object is to enrich rural life and strengthen rural schools in the confidence of those who live in the country, but we cannot hope to do this if we continue as in the past to dissociate the work of the Rural Schools from the great fundamental industry of the country." How better could the youth of the land be educated than by training the powers of observation and creating an interest in matters pertaining to the growth of plants.

Yet we have another and newer department in our work, one which bids fair to rival many of the other branches of Agriculture. I refer to the poultry industry. This department started with co-operative experiments on artificial incubation, and soon became aware of many remarkable facts which they were not able to account for. About a year ago last spring, on certain farms devoted largely to hatching poultry by artificial methods, there was a disease quite prevalent known as "white diarrhoea" which carried off quite a large percentage of the chickens hatched, while other farms were comparatively free from the disease. On the farms affected, the chicks hatched by natural methods were not so subject to the disease, and the question is what caused this? The Poultry and Physics departments at the College have been working together in an attempt to determine wherein the incubator differs from the hen. The results are as follows: the temperature under the hen is lower than that at which some incubators are recommended to be run. there is a much larger percentage

of carbonic acid gas, and also a much higher percentage of moisture under the hen than in the average incubator. Under natural methods this carbonic acid gas and moisture turns the carbonate of lime composing the egg shell into a bicarbonate which is soluble, and the shell rots or softens so that the chick is enabled to extricate itself more easily. Is this an answer to "Why do the chicks stick in the shell? We ask for co-operative work along other lines as follows: The powers of a good laying hen to transmit her good laying qualities to her offspring; the causes of sterility in eggs or the inhatchability of eggs laid by certain hens; to what extent fertility in eggs is hereditary; the best methods of housing, rearing, and feeding for certain results, etc.

It has been suggested that the Union should undertake co-operative work in the testing of vegetables. This is a field where the inestimable value of seed selection, the judicious use of fertilizers, and the effect of spraying for insect and fungous diseases could be demonstrated and much necessary information gained. The day is not far distant when our vegetables and fruit trees will be propagated from healthy stock of the proper type and good bearing qualities, and when the many haphazard methods now employed in the production of seeds and seed grains and nursery stock will be a thing of the past. The same care must be taken in the propagation of plants, which has been taken to produce the splendid specimens of live stock we see to-day.

The demand for quality in an article was never more apparent than at the present time. Labor is scarce, competition is keen, and success depends on the necessary attention given to the details which insure the maximum crop with the minimum of labor. We have ever increasing fungous and insect pests which, if unmolested, will often ruin an entire crop. We must study the demands of the market and study our own soil. To market successfully, co-operation among growers has in some cases become almost an absolute necessity, especially in putting our products in the newer and distant markets.

Co-operation has also been largely instrumental in the improvement of dairying in this country. What would the dairy industry be to-day if the methods of twenty years ago were followed? Then, there was no uniform method of work, and much of the cheese and butter which was produced was unfit for market, but now the dairy stock has been improved, the methods of feeding and housing have been improved, absolute cleanliness has overcome many of the "off flavors" in the milk and its products, and Canadian cheese and butter is of the best.

What the future of the fruit, vegetable, and poultry industries will be, depends on ourselves. The Ontario Government has always been willing to aid properly directed co-operative work in the advancement of agriculture. We should not be content to congratulate ourselves on our past efforts, we should profit by the mistakes of the past.

It is the duty of each student and ex-student to lend a helping hand. We thank the many experimenters in all parts of the Province for their valuable assistance, and those in other walks of life for their encouraging interest.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By J. Buchanan, Agricultural College, Guelph.

In presenting the report of the co-operative work in agriculture for 1906, I am pleased to be able to state that we have had another most satisfactory

year's work. A very large number of reports have been received, and a goodly percentage of these give evidence of decidedly careful work, close observation, and much interest evinced on the part of the experimenters. We now have a large number of ex-students and others who have conducted experimental work successfully for a number of years, and are becoming so trained in the work that they are doing service not only to themselves but to the country as a whole. The experimenters deserve much credit for their work, and the farmers as a whole owe much to these men who are reporting the results of their investigations from year to year.

For the benefit of those who are not familiar with our system of co-operation, it may be well to state that it is to some extent an outgrowth of the experimental work done at the College, and that it is in large measure based on the results of that work. The work of carrying on experiments with farm crops at the College was commenced in 1876, and since that time it has gradually developed along various lines until at present about 2,000 plots are used annually in growing grains, fodder crops, grasses, clovers, roots and potatoes, with the object of obtaining information regarding the best varieties, the most productive selections of seed, the best time to sow the various classes of crops, the most improved methods of cultivation, etc. Since the beginning of this work, a very large number of varieties of all classes of farm crops have been tested, and the best among these are now used for distribution in connection with the co-operative work of the Experimental Union.

In the spring of each year, circulars outlining the co-operative work are distributed by the agricultural committee appointed by the Union. These circulars give a list of all the experiments for which material can be furnished, and each farmer in the Province who sees this list is privileged to select any one experiment, and on sending his application to the College he will receive material for the test which he has chosen. These circulars are sent by mail to the officers and members of the Experimental Union; to the experimenters of former years who have done satisfactory work; to leading farmers, gardeners, and others, whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, inspectors of Public Schools, etc. They are also sent to all persons writing for information regarding the co-operative work, and to all the newspapers of the Province. Most of the newspaper editors are kind enough to print the list of experiments in at least one of their weekly issues; hence it is brought to the notice of a very large proportion of the farmers of Ontario.

During the past year, we have had experimenters in every county and district of the Province, and it is gratifying to notice that a large number of farmers in the newer settlements are taking hold of the work with even greater zest than those in the older districts. The following table gives the list of thirty experiments with spring sown crops and five experiments with autumn sown crops, for which material was furnished to the experimenters in 1906; it also indicates the number of plots required for each experiment.

CO-OPERATIVE EXPERIMENTS IN AGRICULTURE IN 1906.

Grain Crops.

	Plots.
1. Testing three varieties of Oats	3
2. (a) Testing three varieties of six-rowed Barley	3
2. (b) Testing two varieties of two-rowed Barley	2
3. Testing two varieties of Hulless Barley	2
4. Testing two varieties of Spring Wheat	2

	Plots.
5. Testing two varieties of Buckwheat	2
6. Testing two varieties of Field Peas	2
7. Testing Emmer and Spelt	2
8. Testing two varieties of Soy, Soja, or Japanese Beans	2
9. Testing three varieties of Husking Corn	3
Root Crops.	
10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing Kohl Rabi and two varieties of Fall Turnips	3
14. Testing Parsnips and two varieties of Carrots	3
Forage, Fodder, Silage and Hay Crops.	
15. Testing three varieties of Fodder or Silage Corn	3
16. Testing three varieties of Millet	3
17. Testing three varieties of Sorghum	3
18. Testing Grass Peas and two varieties of Vetches	3
19. Testing two varieties of Rape	2
20. Testing three varieties of Clover	3
21. Testing Sainfoin, Lucerne and Burnet	3
22. Testing seven varieties of Grasses	7
Culinary Crops.	
23. Testing three varieties of Field Beans	3
24. Testing three varieties of Sweet Corn	3
Fertilizer Experiments.	
25. Testing fertilizers with Corn	6
26. Testing fertilizers with Swedish Turnips	6
Miscellaneous Experiments.	
27. Sowing Mangels on the level and in drills	2
28. Testing two varieties of early, medium, or late Potatoes	2
29. Testing three grain mixtures for grain production	3
30. Testing three mixtures of Grasses and Clover for hay	3

AUTUMN SOWN CROPS.

1. Testing Hairy Vetches and Winter Rye as fodder crops	2 plots.
2. Testing three varieties of Winter Wheat	3 "
3. Testing five fertilizers with Winter Wheat	6 "
4. Testing autumn and spring applications of nitrate of soda and common salt with Winter Wheat	5 "
5. Testing two varieties of Winter Rye for grain production	2 "

Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size; some, however, were only one rod square. In past years, some plots consisting of one-tenth of an acre and a few which were one-half acre in size were used, but these were found less satisfactory than the small plots. For the following summary, only the results given in the most reliable reports were used. It should be remembered, however, that while only these are used for publication many of those not included as successful experiments would be of much value to the individual experimenters. It frequently happens, that, owing to some unavoidable accident, an experiment may be to some extent injured so that the results cannot be used in the general summary, and yet this experiment may have furnished useful lessons to the farmer conducting it, and in all cases the experimenters obtain much more information from the work which they have carried on than can be given in a tabulated report.

The average results of the successful co-operative experiments with grain crops are presented in the following table:

GRAIN CROPS, 1906.

Experiment.	Varieties.	Comparative value.	Yield per Acre. Straw (tons)	Grain (lbs.)	Grain (bush)
Oats (104 tests)	Siberian	100	1.44	1,740	51.18
	Imported, No. 534	81	1.41	1,716	50.47
	Daubeney	70	1.39	1,606	47.22
Six-rowed Barley (57 tests)	Mandscheuri	99	1.14	1,822	37.95
	No. 21	100	1.12	1,801	37.52
	Oderbrucker	79	1.14	1,733	36.10
Two-rowed Barley (3 tests)	Two-rowed Canadian	100	1.04	1,146	23.88
	French Chevalier	50	1.20	906	18.88
Hulless Barley (14 tests)	Guy Mayle	100	1.33	1,331	22.19
	Black Hulless	80	1.25	1,320	22.00
Spring Wheat (23 tests)	Wild Goose	100	1.87	1,451	24.19
	Red Fife	94	1.50	1,264	21.07
Emmer and Spelt (11 tests)	Common Emmer	100	1.23	1,578	39.46
	Red Spelt	59	1.00	1,106	27.64
Buckwheat (3 tests)	Japanese	100	1.71	1,334	27.78
	Silver Hull	50	1.72	934	19.45
Field Peas (55 tests)	Early Britain	96	1.55	1,427	23.79
	New Canadian Beauty	100	1.74	1,422	23.69
Field Beans (17 tests)	White Wonder	100	.80	1,203	20.05
	Narrowfat	97	.97	1,203	20.05
	New Prize Winner	100	.80	1,196	19.93
Soy Beans (1 test)	Early Yellow	100	1.27	980	16.33
	Medium Green	50	1.75	580	9.67
Winter Wheat (17 tests)	Banatka	100	2.16	1,801	30.01
	Early Genesee Giant	76	1.94	1,532	25.54
	Crimean Red	76	1.91	1,526	25.48
	Imperial Amber	92	1.93	1,406	23.43
	Dawson's Golden Chaff	96	1.69	1,295	21.58
Corn for Grain (16 tests)	Compton's Early	100	whole crop. 14.26	3,369	60.16
	Salzer's North Dakota	91	14.32	3,278	58.54
	King Phillips	91	13.60	3,217	57.44
Mixtures (12 tests)	Daubeney Oats, 34 lbs. per acre Mandscheuri Barley, 48 lbs. per acre	100	straw. 1.37	1,505	.....
	Siberian Oats, 25 lbs. per acre Chevalier Barley, 35 lbs. per acre Wild Goose, Spring Wheat, 22 lbs. per acre	71	1.50	1,478	.....
	Siberian Oats, 34 lbs. per acre Chevalier Barley, 48 lbs. per acre	68	1.32	1,462	.....

The first column of figures in this table represents the comparative value of the varieties as estimated by the experimenters themselves. In making this comparison all the characteristics of the varieties were taken into consideration. The yield of straw, as given in the second column, represents the total crop less the amount of grain, and therefore includes the chaff

with the straw. The yield of grain is given in pounds, and also in bushels per acre, in order that the results may be more clearly understood, and that comparisons may be made between the different classes of crops as well as between the varieties of each class. Owing to the great variation in the weight per measured bushel of the different crops, it is easier to compare the results in pounds than in bushels per acre.

Oats. Of the three varieties of oats distributed for co-operative experiments in the spring of 1906, the Siberian and Imported No. 534 are among the later and heavier yielding kinds which have been tested at the College. The Daubeney is an early variety which is quickly becoming popular among Ontario farmers for the production of oats for use early in the season. It will be noticed that the experimenters have placed the Siberian first in comparative value, and that this variety has also given the largest yield of both grain and straw. The Siberian variety is so commonly grown and so well known throughout the Province that further comment upon it is unnecessary. The Imported No. 534 is one which has given excellent results on our own trial grounds during recent years, and the Daubeney is found to be a very satisfactory variety for growing with six-rowed barley for the production of mixed grain for feeding purposes.

Six-rowed Barley. There were many more applications for this experiment in 1906 than in previous years, owing to the fact that No. 21, a new strain of the Mandscheuri variety, originated at the College, was included in the test and many farmers were anxious to get seed of this new strain. Fifty-seven successful reports were received in all, and it is interesting to notice that while the original Mandscheuri gave a slightly higher yield of grain than the No. 21, the latter was placed first in comparative value. The No. 21 produced stronger and more vigorous looking plants than the Mandscheuri, and no doubt it was owing to its fine appearance that most of the experimenters placed it first in comparative value. It should be stated here that these two kinds of barley were grown close together on the trial grounds at the College in 1906, and among the thousands of farmers who saw them in the month of June, not one thought that the Mandscheuri was equal to the No. 21. Whether this new strain will prove to be superior in yielding powers as well as in appearance in the future, remains to be seen.

Two-rowed Barley. While the two-rowed barleys do not, as a rule, produce quite as much grain as the six-rowed varieties, the grain is usually of better quality. During the past four or five years some of the leading two-rowed kinds have yielded almost as well as the better six-rowed sorts in the tests at the College. For these reasons, we decided to distribute samples of two very distinct varieties of two-rowed barley for co-operative tests in 1906. Unfortunately only a small number of applications were received for material for this test, and only three good reports came to hand in the fall. On averaging these three, we find that the Two-rowed Canadian variety produced five bushels per acre more than the French Chevalier, and was also placed first in comparative value by the experimenters. The Two-rowed Canadian has a strong upright straw and short erect heads, while the Chevalier is very weak in the straw and almost invariably lodges badly before it is ripe. It is stated by English authorities that the varieties of barley belonging to the Chevalier type produce grain which is superior in quality for malting purposes to that produced by any other class of barley. Owing to the fact, however, that it has weak straw and long slender nodding heads and is a comparatively poor yielder, it is not likely to become popular with the farmers of Ontario.

Hulless Barley. The same two varieties of hulless barley were distributed in 1906 as in 1905, but while the Black Hulless gave a slightly higher yield than the Guy Mayle in 1905, the order has been reversed in the past season, and the Guy Mayle stands first both in yield and in popularity. Both of these varieties have been tested at the college for quite a number of years, and the Guy Mayle is found to produce a stiffer straw and usually a larger yield of grain than the Black Hulless. It is not yet so commonly grown however, and there is therefore greater difficulty in securing good seed in quantity.

Spring Wheat. The Wild Goose and Red Fife varieties of spring wheat were again distributed to the experimenters in 1906, and the Wild Goose gave the larger yield of the two, but the difference is somewhat less than it usually is. In 1905 the Wild Goose produced 12.18 bushels per acre more than the Red Fife in the average of the co-operative tests, while in 1906 the difference was only 3.12 bushels. It is interesting to notice that both in the co-operative work throughout the Province and in our own tests made at the College, the varieties of common or flour producing wheat gave considerably larger yields in 1906 than in 1905, while the varieties of macaroni wheat, such as the Wild Goose, yielded much more heavily in 1905 than in 1906. Both Wild Goose and Red Fife are well known and commonly grown in most parts of Ontario, and according to continuous tests made at the College they still stand among the very best varieties in their respective classes.

Emmer and Spelt. While there is not a very great demand for material for the Emmer and Spelt experiment, still eleven first-class reports were received in the autumn of 1906, and the adjoining table shows the usual wide difference, both in yield of grain and in general popularity. It may seem to some of the experimenters that it is useless to continue distributing Spelt for experimental purposes, but the difference in the character and in the actual value of these two classes of crops is not yet generally known throughout the Province, and we are anxious to have both grown in a small way in as many parts of the Province as possible in order that farmers in all localities may become familiar with them and see for themselves the superiority of Emmer over Spelt. The chief difference between these from an economic standpoint are that the Emmer is very much more productive and has a much smaller percentage of hull, and consequently a higher feeding value.

Buckwheat. Only three good reports were received of the test with two varieties of buckwheat. The Japanese stands first with a yield of 27.78 bushels per acre, and the Silver Hull second with a yield of 19.45 bushels. In both cases the amount of grain produced was much less than in 1905. The present year's results show a greater difference in the productive powers of the two varieties than is generally found to exist, either in the co-operative work or in the tests at the Experimental Station at Guelph. The Japanese produces seed of large size and dark color, while the Silver Hull has a smaller seed of a silvery shade.

Field Peas. For the past few years we have sent peas only to those districts where the pea weevil has not yet been found, but in 1906, owing to the fact that the pea weevils were becoming less troublesome, it was decided to send peas for experimental purposes to all parts of the Province from which applications were received. In consequence of this, we received a much larger number of good reports than in 1905. On averaging the results of the fifty-five first-class reports which came to hand, we find that the Early Britain stands first in yield of grain with 23.79 bushels per acre,

and the New Canadian Beauty second with 23.69 bushels. Notwithstanding the fact that the Early Britain gave a slightly higher yield of grain, the New Canadian Beauty was placed first in comparative value in the estimation of the experimenters. Both kinds make a vigorous growth and are well suited for growing on most soils. The Early Britain is a somewhat shrunken pea of greyish brown color, and the New Canadian Beauty a large round white pea.

Field Beans. The three varieties of field beans used in connection with the co-operative experimental work in 1906 were White Wonder, Marrowfat and New Prize Winner. The first two named were equal in yield with 20.05 bushels of grain per acre, and the New Prize Winner third with 19.93 bushels. The White Wonder and New Prize Winner are small white beans, useful for the general market. The two varieties look very much alike and the experimenters placed them equal in comparative value.

Soy Beans. Only a few farmers conducted the experiment with Soy beans, and just one good report was received. By examining the foregoing table, it will be seen that the Early Yellow variety produced about six and one-half bushels of grain per acre more than the Medium Green. The Early Yellow is a variety which usually produces well matured seed at Guelph, but the plants are small as compared with those of the Medium Green. The former is likely to be used for the production of grain for feeding purposes, and the latter for the production of fodder or ensilage.

Winter Wheat. The results of the experiments with autumn sown crops, conducted both at the College and throughout Ontario during the past year, were reported in a circular which was distributed through the mails and published in the newspapers about three weeks before seeding time in the autumn, and no doubt this circular has been read by a great many farmers. In the autumn of 1905, five varieties of winter wheat were sent to those who made application, and the average results of the tests with these varieties are presented in the table in this report. Notwithstanding the fact that the Dawson's Golden Chaff and Imperial Amber gave smaller yields of grain than the other three varieties, they have first and second places in popularity with the experimenters; the Dawson's being the most popular probably because of its clean strong straw. The Banatka which stood first in yield of grain was third in popularity. This is a hard red wheat of good milling quality, but produces rather weak straw, and therefore lodges considerably, especially in wet seasons.

Winter Rye. Of the three varieties of winter rye distributed in the autumn of 1905, the Mammoth stood first in average yield of grain with 41.1 bushels per acre, the Thousand Fold second with 32.9 bushels, and the Common third with 31.8 bushels. These three varieties are very much alike in most respects, though differing somewhat in yield.

Corn for Grain. For the past three seasons, the Compton's Early, Salzer's North Dakota, and King Phillip varieties of corn have been used in the co-operative tests for the production of matured grain. The yields during the past year were considerably higher in each case than in the year 1905, yet the varieties held the same relative positions. By referring to the table, it will be seen that the Compton's Early is placed first in comparative value with one hundred points, and the other two varieties equal with ninety-one points each. All have produced splended crops of grain and the difference between the varieties is not great.

Mixtures for Grain Production. As a result of conducting extensive experiments with a large number of mixtures of grain for the production of grain for feeding purposes at the College, it has been found that a mixture

of barley and oats has given a larger yield of grain than any other combination, and a larger yield than any kind of grain grown separately. We have also learned that one bushel per acre of each is about the right quantity to sow in order to produce the largest possible crop. In addition to this, we have found that certain varieties of barley and oats can be grown together to good advantage, because they mature at about the same time. In order to get further evidence along these lines and to create an interest in the growing of mixed grains, among the farmers of the Province, we have distributed three mixtures for co-operative tests: the first consisting of Daubeney oats and Mandscheuri barley, to be sown at the rate of one bushel of each per acre, the second a mixture of Siberian oats and Chevalier barley, to be sown at the same rate, and the third a mixture of Siberian oats, Chevalier barley and Wild Goose wheat, to be sown at the rate of twenty-five pounds, thirty-five pounds, and twenty-two pounds per acre respectively. Eleven good reports of this test were received in 1905, and twelve in 1906. In each case the early mixture consisting of Daubeney oats and Mandscheuri barley gave the heaviest yield and stood first in the estimation of the experimenters for use on their farms. The results of all these tests may be seen in referring to the foregoing table.

FIELD ROOTS AND FODDER CROPS.

Experiments.	Varieties.	Comparative value.	Yield per Acre.
			Tons.
Mangles (7 tests)	Yellow Leviathan	100	42.66
	Sutton's Mammoth Long Red	62	39.97
	Steel Briggs' Giant Yellow Globe	69	36.93
Sugar Beets (7 tests)	Giant White Feeding	100	39.13
	Royal Giant	62	32.62
Swede Turnips (6 tests)	Sutton's Magnum Bonum	100	20.83
	Hartley's Bronze Top	82	19.76
	Kangaroo	55	18.42
Carrots and Parsnips (5 tests)	Mastadon White Intermediate Carrot	73	18.26
	Bruce's Mammoth " "	100	17.30
	Buckbee's New Sugar Parsnips	45	14.79
Fodder Corn (4 tests)	Henderson's Eureka	50	16.75
	Leaming	90	14.64
	White Cap Yellow Dent	100	14.30
Millet (5 tests)	Japanese Barnyard	100	12.03
	Japanese Panicle	85	11.01
	Hungarian	46	7.87
Sorghum (1 test	Kaffir Corn	100	9.80
	Early Minnesota Sugar Cane	67	9.24
	Early Orange " "	33	6.00
Grass Peas and Vetches (3 tests)	Hairy Vetches	86	7.87
	Grass Peas	100	7.31
	Common Vetches	100	6.75
Rape (1 test)	Dwarf Bonanza	100	25.48
	Dwarf Essex	50	22.72

Mangels. The three varieties of mangels used in the co-operative work in 1906 represent three distinct types; namely, the long, the intermediate, and the globe. The Yellow Leviathan variety which gave the largest number of tons of roots per acre, also stood highest in yield in the co-operative tests of 1905 and 1904. These three kinds are among the best of their respective types. The experimenters therefore have an opportunity of deciding for themselves which class of mangels is likely to give the best satisfaction on their respective farms. By referring to the foregoing table it will be seen that the Yellow Leviathan not only gave the largest yield, but was decidely the most popular variety with the experimenters.

Sugar Beets for Feeding Purposes. The same two varieties of sugar beets were used for co-operative tests in 1905 and 1906, the Giant White Feeding giving a yield of about six and one-half tons per acre more than the Royal Giant in 1906. The Giant White Feeding is a comparatively new variety which has been under test at the College for only a few years. The roots of this variety are white with a greenish top, while the Royal Giant is of a pink shade above the ground.

Swede Turnips. Only six good reports of the test with three varieties of swedes came to hand in the autumn of 1906. On averaging these six, we find that the Sutton's Magnum Bonum produced 20.83 tons of roots per acre, the Hartley's Bronze Top 19.76, and the Kangaroo 18.42. The Sutton's Magnum Bonum is a smooth round variety of fine appearance and is quickly becoming a favorite in this country. The Hartley's Bronze Top is another globe variety, while the Kangaroo is somewhat cone shaped, tapering gradually towards the root.

Carrots and Parsnips. It has been the rule for the past few years to send out one variety of parsnips along with two of carrots, in order that farmers might see for themselves the comparative yielding powers of these two classes of roots. The Mastadon White Intermediate carrot has been the leader in this test for the past two years and is also one of the very best varieties grown at the College. By examining the table, it will be found that the difference in yield between the two varieties of carrots is not great, but the parsnip has given a considerably lower yield than the carrots, both in 1905 and 1906.

Fodder Corn. On averaging the results given in the four good reports on the fodder corn test, we find that while the Henderson's Eureka produced over two tons of fodder per acre more than either of the other varieties, still it stands lowest in the estimation of those conducting the test. The explanation of this seeming inconsistency lies in the fact that the first mentioned variety grows very tall and produces a large bulk of stalk and leaf. It also produces a good proportion of ears, but these do not, as a rule, reach a sufficiently advanced stage of maturity to make ensilage of the best quality. On the other hand, the White Cap Yellow Dent and Leaming varieties mature at an earlier date, and while they do not give as large a total yield there is a larger proportion of ears, and these are well enough matured to give the ensilage a much better quality; that is, a higher feeding value.

Millet. The three varieties of millet furnished to the experimenters have given somewhat poorer results during the past year than they did in 1905. The Japanese Barnyard stands first with a yield of 12.03 tons of green crop per acre in 1906, while the same variety produced 16 tons per acre in 1905. It is interesting to notice the superiority of the two Japanese varieties over the Hungarian, which is so commonly grown on the farms of this Province.

Sorghum. There is but a slight demand for material for the experiment with three varieties of sorghum. It is not probable that this class of crop will come into general use in Ontario, since it requires at least as long a season to reach maturity as the better varieties of corn, and does not, as a rule, produce nearly such a large amount of fodder per acre. Contrary to expectations, the Kaffir Corn took first place in yield in 1906, while the Early Minnesota Sugar Cane stood second with about one-half ton per acre less than the amount produced by the Kaffir Corn. The saccharine varieties, commonly called sugar canes, generally produce considerably larger crops than the Kaffir Corn.

Grass Peas and Vetches. For the past few years Grass peas and two varieties of vetches have been used in the co-operative work. On examining the accompanying table, it will be found that while the Hairy vetches produced the largest amount of green crop, they have not met with the approval of the experimenters, since they are placed lowest in comparative value. This may be due to the fact that they are not quite so freely eaten as the Grass peas and common vetches. In the southern part of the Province the Hairy vetches can be sown to best advantage in the autumn, but at Guelph and in districts farther north the crop is considerably winter killed and can therefore be more profitably sown in the spring, especially when the crop is intended for the production of fodder.

Rape. Only one good report of the experiment with two varieties of rape was received in the autumn of 1906, and in this test the Dwarf Bonanza produced about two and three-quarters tons of green rape more than the Dwarf Essex. These two varieties of rape very closely resemble each other, and it is likely that if a large number of reports had been received there would not have been so much difference in the yield.

Clovers. For a number of years, three varieties of clover have been distributed to different parts of the Province for co-operative tests. The experiments with these crops will be chiefly valuable to the individuals conducting them. Owing to the fact that they are perennials, which continue to produce crops for several years, it is very difficult to get satisfactory reports which can be summarized in a way suitable for presentation to the public. However, as these experiments furnish useful object lessons for the experimenters themselves, it is deemed advisable to continue to send out seeds of Common Red Clover, Mammoth Red clover, and Alsike to those who wish to experiment with them.

Perennial Crops. Another experiment which is of value chiefly to the individual experimenters is one with Lucerne, Sainfoin, and Burnet. In general, it may be said that the Lucerne is giving good satisfaction in many parts of Ontario. If sown on well drained soil it usually produces three or four good crops each year, and the fodder or hay made from it is of high feeding value when properly handled. Lucerne can be most profitably grown as a soiling crop, since it gives a continuation of green fodder throughout the season. The Sainfoin and Burnet are not proving so satisfactory for general cultivation as the Lucerne, but might be used to advantage for certain specific purposes.

Autumn Sowing of Winter Rye and Hairy Vetches for Fodder Purposes. For the production of fodder, Hairy vetches and Winter Rye were grown this year for the fourth time. Several reports of this experiment were received, but as the Vetches were completely winter killed in most places, no good comparison of the yields can be made. In several tests, Winter Rye gave very good results. The experimenters report that these crops were fed

to different classes of animals; in general, the Vetches were relished by all kinds of stock, but the Rye was not freely eaten, excepting by horses.

Sweet Corn, 1906.

As sweet corn is grown by all classes of people, there are quite a large number of applications for seed each year. In the spring of 1906, seed of the Ringleader, Golden Bantam, and Mammoth White Cory varieties were sent out for test, and twenty good reports of this experiment were returned in the fall. The following table gives the average number of ears produced by each variety, the average number of days required for the corn to reach the stage in which it can be used for table purposes, and an estimate of the table quality and the comparative value of the different kinds.

Experiment.	Varieties.	Comparative value.	Table quality.	Comparative number of ears.	Number of days until ready for table use.
Sweet Corn (20 tests)..	Ringleader	100	88	158	70
	Golden Bantam	84	100	158	73
	Mammoth White Cory	100	93	159	74

It will be seen that the number of ears produced by these varieties is almost exactly equal, and that the Golden Bantam is placed first in table quality. It is therefore difficult to understand why the last named variety should be placed much lower in comparative value than the other two. The explanation of this may be found in the fact that the Golden Bantam produces small ears of yellow color, while the Ringleader and Mammoth White Cory produce larger ears which are white in color and are therefore better suited for the general market. The Golden Bantam is a very palatable corn, and will therefore stand high in the estimation of many people who prefer quality rather than quantity.

Method of Sowing Mangels.

For a number of years, experiments have been conducted at the College to determine whether it was better to sow the seeds of root crops on drills or on the level ground. In the majority of cases it was found that a larger crop of roots was produced when the seeds were sown on the level. In order to confirm the results of these tests and to bring the matter more prominently before the farmers, it was decided to include an experiment of this kind among the co-operative tests for 1906. For this purpose, mangel seed was distributed to a number of applicants, but only one good report of this test was received. In this one test, however, the results are similar to those obtained at the College on our own trial grounds, the plot on which the seed was sown on the level ground producing a yield of 33.3 tons of roots per acre, as compared with 30.7 tons per acre from the drilled plot.

Fertilizer Experiments.

As considerable co-operative work has been done along the line of testing a number of fertilizers with various classes of spring crops, a table is

here presented which gives a summary of the results of all the experiments conducted within the past fourteen years, including the tests of fertilizers with corn in 1906.

Kind of fertilizer used.	Fertilizer per acre.	Average yield per acre.				
		Oats.	Mangels	Fodder Corn.		Swede Turnips
		5 years, 74 tests.	5 years, 41 tests.	Whole crops, 8 years, 47 tests.	Husked ears, 8 years, 41 tests.	4 years, 12 tests.
	lbs.	bus.	tons.	tons.	tons.	tons.
Nothing	.....	38.9	20.6	8.2	2.7	21.9
Nitrate of soda	160	46.3	26.5	9.4	3.1	24.1
Superphosphate	320	43.6	24.2	9.0	3.1	24.9
Complete fertilizer	213	48.7	25.4	9.4	3.2	25.9
Muriate of potash	160	43.8	24.6	9.4	3.0	27.2
Cow manure	40,000	.....	.....	.....	.....	30.1

Oats, Mangels, Fodder Corn and Swede Turnips.

In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre and the superphosphate at the rate of 320 pounds per acre. The mixture, or complete fertilizer, has been composed of one-third of the amount of these fertilizers, making in all 213⅓ pounds. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and the muriate of potash and the superphosphate at the time of sowing the seed. The cost price of each of the fertilizers would be about $4.60 per acre. Farmyard manure has been used in the experiments of the past five years. The advice of each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

In connection with the co-operative work, experiments have been conducted with fertilizers on oats for five years, on mangels for five years, or corn for eight years, and on swede turnips for four years. The results for 1906 are confined to the experiments with fertilizers on corn.

Fertilizers with Corn. In the average of the experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yield of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and complete fertilizer were equal, while the plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained where complete fertilizers was applied to the land.

Fertilizers with Swede Turnips. On averaging the results given in all the reports on the test of fertilizers with swede turnips, we find that barnyard manure has been instrumental in producing the largest yield of roots and that the complete or mixed fertilizer stands second in this respect. It should also be observed that the superphosphate has given the best result

among the individual commercial fertilizers. This goes to confirm the general opinion that phosphatic fertilizers can be more profitably applied to turnip land than either nitrogenous or potassic fertilizers.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, namely, 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, namely, 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre produced by the nitrate of soda over the unfertilized land was obtained at a cost of about 2.3 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the land which was fertilized at the rate of one hundred and sixty pounds of nitrate of soda per acre gave an average yield of $7\frac{2}{3}$ tons per acre more than the land which was unfertilized.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, viz., 38.9 bushels per acre; and the highest average yield from the complete fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed, or complete fertilizer, gave the largest yield of oats per acre in the average results of this experiment for each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 47 cents per bushel. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Potato Experiments, 1906.

Experiments.	Potatoes.	Comparative value.	Per cent. rotten.	Per cent. of small tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late varieties (86 tests)	Empire State	100	1	11	86	174.67
	Dempsey's Seedling	100	2	11	100	168.49
	American Wonder	78	1	11	78	165.80
Medium varieties (70 tests)	Rose of the North	100	2	12	100	164.36
	Burpee's Extra Early	82	2	12	97	150.23
	Seedling No. 230	68	2	11	72	147.62
Early varieties (144 tests)	Early Dawn	100	1	9	100	173.17
	Early Fortune	97	1	14	76	168 44
	Early Andes	97	3	14	79	143.63
	Early Pinkeye	69	.....	15	52	133.88

Varieties of Potatoes. From year to year we find that there are many more applications for potatoes for experimental work than are received for any other class of material. This is owing, no doubt, to the fact that a potato test is comparatively easy to look after, and many persons are anxious to secure improved varieties. A very large number of applications were received in the spring of 1906, and three hundred first-class reports came to hand in the autumn after the crops had been harvested. From the foregoing table it will be seen that the varieties distributed were divided into three distinct classes; early, medium, and late. The same three late varieties were distributed in 1906 as in the previous year, but the results are slightly different. In the average of the co-operative tests for 1905, the Dempsey's Seedling produced about seventeen bushels per acre more than the Empire State, but by referring to the accompanying table it will be seen that the Empire State stands first in 1906 with 174.67 bushels; Dempsey's Seedling second with 168.49 bushels, and the American Wonder third with 165.80 bushels. While there is a difference in yield of about six bushels per acre between the Empire State and Dempsy's Seedling, it will be noticed that the experimenters have placed these two varieties equal in comparative value. In mealiness or table quality, the Empire State was placed first in 1905 and the Dempsey's Seedling first in 1906. Our experience at the College goes to show that there is but little difference between these two varieties in regard to table quality.

Among the three medium varieties sent out in 1906, the Rose of the North has given the best all round results, standing first in yield of potatoes as well as in table quality, and also being placed first in comparative value by the experimenters. To some readers of this report it may seem inconsistent to have the Burpee's Extra Early placed among the medium ripening varieties. As a matter of fact this name is somewhat misleading, as the variety does not mature along with the earlier kinds.

All four of the early varieties used in the co-operative work in the past year are of high value, and judging from general experience it would be rather difficult to make a decided choice among them. By referring to the table here presented, however, it will be seen that in the co-operative tests the Early Dawn is an easy winner, since it stands first in all respects excepting in freedom from rot, and even in this it is very good, since only one per cent. of the potatoes were found to be decayed. In general appearance, the Early Dawn and Early Fortune are very much alike, being about the same shape and color.

A MEMBER: How do you account for the fact that there are so many applications for potato seed?

Mr. BUCHANAN: All the people eat potatoes, and most of the people grow potatoes. A potato experiment is easily conducted, while some of the other crops are much more difficult to handle.

Mr. BROWN: During the last two or three years, I have had difficulty in getting potatoes marketed because the wholesale houses refused to buy them, stating that Ontario potatoes would not keep. Have you any information regarding the keeping qualities of potatoes?

Mr. BUCHANAN: I cannot say that we have, any more than our general observations of the varieties which we have been growing, but most of them keep quite well if there are no rotten ones among them when they are stored.

Mr. BROWN: At the present time a great many Quebec potatoes are being used in preference to those grown in Ontario.

A MEMBER: Is the Hairy vetch a perennial?

Mr. Buchanan: No, the vetches are both annuals, but the Hairy vetch is what we usually call a winter annual; that is, it is sown in the autumn and matures the following season. We have found, however, that at Guelph it becomes badly winter killed when sown in the fall, and we therefore sow it in the spring as a green fodder or green manuring crop.

A Member: From Hamilton south, on the shore of Lake Ontario, they grow it for seed, but only a few men are growing it as a main crop, even there. It is used chiefly as a cover crop.

A Member: Do you find any difference in the time of ripening of different strains of White Cap Yellow Dent corn? We have a strain that comes twelve days earlier than the White Cap Yellow Dent shown at the Fair.

Mr. Buchanan: At the present time we have five or six strains of this variety, and we are testing them side by side, and find quite a difference in the time of maturing of the different strains.

A Member: Is the Daubeney oat weak in the straw?

A.—It is fine, but stands fairly well.

Q.—In growing mixed grains, could any other variety of barley besides the Chevalier be grown with the Siberian oats?

A.—Yes, you might use Two-rowed Canadian barley, as it will also mature at about the same time as the oats.

Q.—Why were peas not used in the mixture?

A.—Peas were used in several of the mixtures tested at the College, and they were found very useful when the crop was grown for fodder, but when a mixed grain crop was desired we found that we got larger yields from the mixture of barley and oats without any peas.

Prof. Hutt: We have tried several mixtures as cover crops for the orchard, but have not secured as good results as when the crops were sown singly, excepting in one case. One year we used a mixture of Horse beans, Prussian Blue peas and Crimson clover and they gave us the heaviest crop we have obtained, but following it up year after year we do not get as good results. In the case mentioned, the Horse beans held the peas up and then came the Crimson clover underneath, and we had what might be called a three-story crop.

Mr. Raynor: These experiments have certainly excited a great deal of interest throughout the country. Shortly after Prof. Zavitz introduced Mandscheuri barley, some people down east obtained the seed, and they supplied most of the farmers in that locality. As a result of this, the farmers down there look upon the O. A. C. boys as benefactors of that district. They say that the introduction of this variety has meant hundreds and thousands of dollars to them. I am satisfied that all the money used for this co-operative work is being profitably spent. One thought that came to me while Mr. Buchanan was speaking was, that we have not in this report any mention of the conditions surrounding individual experiments. Of course the experimenters themselves have this information at hand, but the summary report seems to be lacking in this respect. I know, of course, that we cannot have all of these things embodied in one report.

CO-OPERATIVE EXPERIMENTS IN FRUIT-GROWING.

By Prof. H. L. Hutt, O. A. C., Guelph.

I am pleased to report that great progress has been made during the past year in the co-operative testing of fruits. This work began in a small way thirteen years ago, with sixty experimenters testing strawberries, raspberries and currants. Every year since then it has steadily increased, more

taking part in the experiments, and a greater variety of fruits being tested, till this year the work has more than doubled that of any previous year. The following table gives a good idea of the progress of the work, as it shows the nature and number of the experiments taken up since its inception in 1894:

Co-Operative Experiments with Fruits.

Nature of Experiment.	Number of Experimenters.													Total
	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	
Strawberries	15	20	20	50	100	100	100	116	143	119	166	222	244	1,415
Raspberries	15	20	20	20	25	25	25	35	48	44	46	69	93	485
Black Raspberries	15	20	20	20	25	25	25	35	52	43	53	46	67	446
Blackberries	....	....	20	20	25	25	25	35	32	47	42	42	32	345
Currants	15	20	20	20	25	25	25	38	48	29	39	48	31	383
Black Currants	....	....	....	....	....	....	....	....	....	43	47	50	53	193
Gooseberries	....	20	20	20	25	25	25	50	47	39	40	55	71	437
Grapes for Southern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	82	82
Grapes for Northern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	69	69
Apples for Southern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	144	144
Apples for Northern Ontario	....	....	....	....	....	....	....	....	....	....	....	....	264	264
Total	60	100	120	150	225	225	225	309	370	364	433	532	1,150	4,263

From this table it will be seen that four new experiments with grapes and apples were added to the list this year. Material was distributed to 1,150 experimenters, and in all, material has been sent out for 4,263 experiments.

The total number of plants distributed has been 111,874, made up as follows: Strawberries 67,920, raspberries 11,640, black raspberries 10,704, blackberries 8,280, currants 4,008, black currants 1,544, gooseberries 4,424, grapes for Southern Ontario 492, for Northern Ontario 414, apples for Southern Ontario 864, apples for Northern Ontario 1,584.

Plan of Distribution.

Early in the year a circular, as given below, was sent out offering plants for testing, and the same was published in many of the leading agricultural and local papers. This gives particulars regarding the kinds of fruits, and the plan of distribution.

Dear Sir,—During the past ten years extensive variety tests with a great number of fruits have been carried on at the Ontario Agricultural College and at the twelve Ontario Fruit Experiment Stations in various parts of the Province. These tests have enabled us to determine what are the best varieties of each kind of fruit for the sections in which they have been tested. The object of this co-operative testing is to distribute more widely these leading varieties, that they may be further tested in every township of the Province, and that each grower may select for himself and grow more extensively those varieties which give the best results on his own particular farm. About 2,000 experimenters are already engaged in this work, and we desire the co-operation of all who are interested in fruit-growing.

The work is carried on through the agency of the Experimental Union, an organization managed by the officers, students, and ex-students of the Ontario Agricultural College, but every resident of Ontario interested in agriculture or horticulture is invited to join in the work and benefit by the results of the experiments.

The following list of experiments show the class of fruits and varieties of each offered for planting last spring. The varieties named make a good general collection for home use, and in most cases cover the season from early to late. They have been selected, after years of careful testing, as the ones most likely to give good results throughout the Province.

No. 1. Strawberries: Splendid, Clyde, Tennessee, and Irene. 12 plants of each.

No. 2. Raspberries:—Cuthbert, Golden Queen, Marlboro', and Columbian. 6 plants of each.

No. 3. Black Raspberries:—Gregg, Kansas, Palmer, and Older. 6 plants of each.

No. 4 Blackberries:—(Adapted only to *Southern sections of Ontario) Agawam, Eldorado, Kittatinny, and Snyder. 6 plants of each.

No. 5. Currants:—Fay, Red Cross, Victoria, and White Grape. 2 plants of each.

No. 6. Black Currants:—Champion, Lees, Naples, and Black Victoria. 2 plants of each.

No. 7. Gooseberries:—Downing, Pearl, Red Jacket, and Whitesmith. 2 plants of each.

No. 8. Grapes:—(For Southern Ontario) Concord, Wilder, Niagara, Lindley, Brighton, and Vergennes. 1 vine of each.

No. 9. Grapes:—(For *Northern Ontario) Champion, Worden, Winchell, Delaware, Lindley, and Moyer. 1 vine of each.

No. 10. Apples:—(For Southern Ontario) Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy. 1 tree of each.

No. 11. Apples:—(For Northern Ontario) Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab. 1 tree of each.

Each person in Ontario who wishes to join in the work may choose any one of the experiments for 1906, and send in his application upon the accompanying form. If no form is at hand, all we require is that the applicant give the number of the desired experiment and agree to follow the directions furnished; to properly care for the plants, and to report the results at the end of each season as requested.

The material will be furnished in the order in which the applications are received, until the supply becomes exhausted.

A sheet giving cultural directions and instructions for the experiment chosen will be sent to each experimenter in due time, and plants will be sent by mail from the nursery in good time for spring planting.

All will be furnished free of charge, and the plants and produce become the property of the experimenter. In return we expect that each experimenter will follow the instruction given and will report each year, as requested, upon the growth and yield of each variety under test. Blank forms will be furnished annually for this purpose.

* This division of the Province into North and South may be approximately made by a line running from Collingwood to Kingston.

The experiment selected should be indicated by using its number, as given in the list. It is well for each applicant to make a second choice in case the first cannot be granted. The supply of plants being limited, those who apply promptly will be most likely to get what is wanted.

Address all applications to H. L. Hutt, Ontario Agricultural College, Guelph, Ont.

Application for Plants.

The conditions on which the plants are sent out are, that the experimenter will endeavor to follow the directions furnished in caring for them and will report the results at the end of the season. And no plants are sent to anyone who will not agree to these conditions.

The following is the form of application sent with the circular offering plants for testing:

General Directions to Experimenters.

When sufficient applications had been received to make up our list of those to whom plants could be sent, a circular was sent acknowledging receipt of the application, that he might expect the plants, and giving general directions for conducting the experiment.

Accompanying the general directions a set of special directions was also sent for each kind of fruit. These are here given in connection with each of the experiments.

Experiment No. 1.—Strawberries.

There has been a greater demand for this experiment than for any other on the list. Two hundred and forty-four experimenters chose this experiment this year and 222 last year. During the past thirteen years, 1,415 lots of plants have been sent out, or in all 67,920 plants.

One reason why this has been a popular experiment is because the strawberry can be more widely grown over the country than most other fruits. It is particularly adapted to northern sections of the Province, where many of the other fruits are not hardy. This is because the deep snows in these sections give the plants the best kind of winter protection.

The varieties sent out this year and last year were: Splendid, Clyde, Tennessee, and Irene. All of these are well worthy of a place in a collection for home use. So far 140 experimenters have reported on the crop, from the plants sent out last year. Clyde has been the most productive, while Tennessee ranks next. Both of these are midseason varieties. Splendid is one of the best early varieties, while Irene is a good late one.

One hundred and sixty-four of the experimenters who received plants this year have reported on the growth of the plants. There has, of course, been a number of failures, but, on the whole, the plants carried better this year than usual.

The strawberry plant loses vitality quickly when out of the ground, hence it is a difficult one to send long distance by mail. But it multiplies so rapidly that if the experimenter succeeds in getting a few of each variety to live, he can quickly propagate for himself all the plants he wants.

In order to get the experimenters to continue the work with plants of their own growing, a circular was sent out in the spring to all who received plants last year, advising them to set out a new plantation with plants from last year's plots. In many cases these little plots have thus become centres for the distribution of plants to others in the neighborhood, and in this way the value of the work is increased.

Cultural Directions.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of barnyard manure.

2. Set the plants in rows, at least 4 feet apart and about 18 inches apart in the row. If two or more varieties are planted in the same row, leave a space of at least 3 feet between them to avoid mixing of the runners.

3. The best method of planting is to use a spade, thrusting it deeply into the ground, then pressing it backwards and forwards. Into the opening thus made, spread out the roots fan-shaped, and pack the soil firmly about them with the foot.

4. Give clean, thorough cultivation throughout the first season and never allow the soil to become crusted.

5. Pinch off all blossoms the first season, that the plants may make vigorous growth and not waste their vigor trying to produce fruit.

6. Confine the runners of each variety to its own row, allowing them to form matted rows about a foot and a half wide. If any of the plants should die, place the runners of the adjoining plants so that they will fill up the spaces.

7. As soon as the ground is frozen in the fall, cover the whole plantation with an inch or two of strawy stable manure. When danger of frost is over in the spring, rake the coarsest of this covering off the plants and tread it down between the rows for a mulch. If it is not thick enough to keep down weeds and retain moisture, more may be added, at any time in the spring.

8. To continue the experiment from year to year, a similar plantation should be set out each spring, taking a dozen new plants of each variety from the plots set out the year before. The old plots may be plowed up after the second crop is off.

9. Carefully weigh and record the weight of each picking from each variety, and report the total crop from each as soon as possible after the fruiting season.

Note.—*Keep these directions, as they may be useful for future reference.*

Experiment No. 2.—Raspberries.

The varieties for this experiment were Marlboro, Cuthbert, Golden Queen, and Columbian. These varieties differ so much that although they are all included in the experiment, we do not ask for a comparison of yields with a view to discarding any of them, for all are desirable in a collection for home use.

Marlboro is one of the best early red raspberries, while Cuthbert is the leading red for main crop. Golden Queen is practically a yellow Cuthbert, a desirable variety for home use, but not one in demand for the general market. Columbian is one of the purple-cane group of raspberries and produces purple colored fruit. It is very productive, and by some of the experimenters is preferred to Cuthbert for home use, although the fruit is not so attractive in appearance.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposing the roots to the sun or drying winds; cover with moist, mellow, surface soil, and tramp firmly.

3. Set the bushes at least five feet apart, in one or more rows, as convenient. If planted all in one row, it is a good plan to arrange in the following order to avoid mixing the suckering kinds: 6 Cuthbert, 3 Columbian, 6 Golden Queen, 3 Columbian, and 6 Marlboro.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their vigor trying to produce fruit.

5. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

6. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly on the ground, are particularly valuable for bushes, vines and trees.

7. The suckering varieties may be allowed to form a narrow hedge row, but do not let the varieties become mixed by letting the suckers grow up between the different kinds.

8. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin the weaker new canes, leaving about half a dozen of the strongest to each bush if kept in hills, or have them stand about 10 inches apart if grown in a hedgerow. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

9. In northern localities, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

10. Should any spaces have to be fil'ed, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up around the bushes. The Columbian is propagated by bending down the tips of the new canes in August and covering them with a few inches of soil. They should make good strong plants by the following spring.

11. Carefully weigh and record the weight of each picking from each variety, and report the total crop from each, as soon as possible after the fruiting season.

Experiment No. 3.—Black Raspberries.

The varieties sent out for this experiment for several years were Gregg, Kansas, Palmer, and Souhegan, but for the past two years Older has been sent in place of Souhegan. Gregg is reported by most of the experimenters as the most productive, and Kansas and Palmer rank next in the order named. The canes of Gregg, however, are often winter killed in northern sections. The Older is one of the hardiest varieties we know of, and it has been included in the test in the hope that it may succeed where the other varieties prove too tender.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.

3. Set the bushes at least five feet apart in one or more rows, as convenient.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their vigor trying to produce fruit.

5. Do not allow adjoining crops to encroach upon the bushes. To ensure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

6. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

7. To make the bushes stout and branching, pinch off the ends of the new canes during the early summer when they reach a height of two or three feet.

In northern sections, where winter protection is necessary, it is best to let the canes grow long and slender, that they may be more easily laid down.

8. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin out the weaker, and any diseased canes, leaving about half a dozen of the best and strongest to each bush. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of the growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

9. In northern localities, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

10. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by bending down the new canes in August and covering the tips with a few inches of soil. They should make good strong plants by the following spring.

11. Carefully weigh and record the weight of each picking of fruit from each variety, and report the total crop from each as soon as possible after the fruiting season.

Experiment No. 4.—Blackberries.

For several years this experiment has been chosen by experimenters all over the Province, and by many even in the more northern sections, but

the reports have shown that, although the roots of the plants may come through the winter uninjured, the canes are usually frozen back, often to the snow line. For this reason we stated, in our circular offering plants last spring, that blackberries were adapted only to the southern sections of the Province.

The varieties distributed were: Agawam, Eldorado, Kittatinny, and Snyder. A few experimenters in the southern sections of the Province report that Kittatinny has been the most productive, but by far the greater majority report that Agawam is both the hardiest and heaviest yielder.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.

2. When transplanting cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow surface soil and tramp firmly.

3. Set the bushes at least five feet apart, in one or more rows, as convenient. As the suckers spread a long distance, the different varieties should be at least eight or ten feet apart to avoid their becoming mixed.

4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the bushes should mature their canes for winter.

5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.

6. To make the bushes stout and branching, pinch off the ends of the new canes during the early summer, when they reach a height of two or three feet.

In northern sections, where winter protection is necessary, it is best to let the canes grow long and slender, so that they may be more easily laid down.

7. Prune every year, either in the late fall or early spring. Cut out all old canes that have fruited, and thin out the weaker new ones, leaving a half dozen of the strongest to each bush, or allowing the new canes to fill in between those first planted, forming narrow hedgerows. Do not let the varieties become mixed by letting the suckers grow up between the different kinds. Cut back the ends of the canes left to a uniform height of three or four feet, depending upon the vigor of growth. Where the canes are liable to winter killing, it is well to leave this shortening in till spring, when all frozen wood can be cut off.

8. In northern sections, where winter protection is necessary, bend down the canes late in the fall and cover the tops with earth to keep them under the snow.

9. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the suckers, which spring up among the bushes.

10. When they come into bearing carefully weigh and record the weight of each picking from each variety, and report the total crop of each as soon as possible after the fruiting season.

Experiment No. 5.—Currants.

Currants are among the hardiest of the bush fruits. The plants also retain their vitality well in shipment, and transplanting, so that, as a rule, the experimenters have good success with their currant bushes. The varieties sent out for this experiment for a number of years were: Raby Castle, Fay, Victoria, and White Grape. With the majority of the experimenters the Raby Castle stands first for productiveness, but the fruit is so much smaller than that of the other varieties that either Fay or Victoria are preferred to it. This year Red Cross, a new variety which has given excellent results at the College for several years, was sent out instead of the Raby Castle. It remains to be seen if it will prove as successful over the country generally as it has been here. The White Grape currant is a favorite with many of the experimenters for home use.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.
2. When transplanting cut back the dry or injured root ends to fresh, sound wood: avoid exposure to the sun or drying winds, cover the roots with moist, mellow surface soil and tramp firmly.
3. Set the bushes five feet apart, in one or more rows, as convenient.
4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.
5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines and trees.
6. Look for young currant worms on the lower leaves of the bushes as soon as the leaves are full grown. They may easily be killed by spraying with Paris green, 1 ounce to 10 gallons of water, or hellebore, 1 ounce to 3 gallons of water. To be most effective this should be sprayed on from under side of the bushes. A second brood of the worms sometimes appears about midsummer, when a second spraying may be necessary.
7. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.
8. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about eight inches long, of the new wood pruned out, and planting them about six inches deep in moist mellow soil.
9. Carefully weigh and record the weight of crop from each variety, and report the results as soon as possible after the fruiting season.

Experiment No. 6—Black Currants.

The plants for this experiment were sent out first four years ago. Altogether 193 experimenters have received plants, and 120 have reported upon them this fall. Nearly all report that the plants have lived and done well. The varieties included in the test are: Champion, Lees, Naples, and Black Victoria. The reports of yields show that there is no very great difference in the productiveness of these varieties, for each is reported in one place or another as having done the best. On the whole, Lees and Black Victoria are the favorites.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.
2. When transplanting, cut back the dry or injured root ends to fresh, sound wood; avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.
3. Set the bushes at least five feet apart in one or more rows, as convenient.
4. Do not allow adjoining crops to encroach upon the bushes. To ensure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.
5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.
6. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form, with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.
7. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about 8 inches long of the new wood pruned out and planting them about six inches deep in moist, mellow soil.
8. Carefully weigh and record the weight of crop from each variety, and report the results as soon as possible after the fruiting season.

Experiment No. 7.—Gooseberries.

Gooseberries are quite as hardy as currants, and may be grown anywhere in Ontario. The plants also stand shipping and transplanting well, consequently, the experimenters, as a rule, report that the plants have lived and done well. In some sections the plants suffered with the extreme drouth. The varieties included in this experiment are: Pearl, Downing, Red Jacket, and Whitesmith. Pearl has, on the whole, proved to be the heaviest yielder, but more good reports of Whitesmith have been received this year than usual. Wherever this variety can be grown free of mildew, it is one of the finest for either home use or market.

Cultural Directions.

1. Select a well drained site, and prepare the land deeply and thoroughly.
2. When transplanting, cut back the dry or injured root ends to fresh, sound wood: avoid exposure to the sun or drying winds; cover the roots with moist, mellow, surface soil and tramp firmly.
3. Set the bushes five feet apart, in one or more rows, as convenient.
4. Do not allow adjoining crops to encroach upon the bushes. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer.
5. The fertility of the soil about the bushes may be most economically maintained by occasional applications of barnyard manure. Unleached wood ashes, spread evenly over the ground, are particularly valuable for bushes, vines, and trees.
6. Look for young currant worms on the lower leaves of the bushes as soon as the leaves are full grown. They may easily be killed by spraying with Paris green, 1 ounce to 10 gallons of water, or hellebore, 1 ounce to 3 gallons of water. To be most effective this should be sprayed on from the under side of the bushes. A second brood of the worms sometimes appears about midsummer, when a second spraying may be necessary.
7. Prune every year, either in the late fall or early spring. A good plan is to grow them in the bush form with about six branches to the bush. Then adopt a renewal method of pruning by cutting out every year two of the oldest branches, and allowing two strong new ones to take their place. Cut out all the other new canes which come from the bottom, and shorten back the two left to about two feet, to cause them to branch out at a proper height.
8. Should the experimenter wish to increase his stock of any of the varieties, he may readily do so by layering a few of the lower new canes, or making cuttings about eight inches long, of the new wood pruned out, and planting them about six inches deep in moist mellow soil.
9. Carefully weigh and record the weight of crop from each variety, and report the result as soon as possible after the fruiting season.

Experiments Nos. 8 and 9.—Grapes.

Experiments with grapes were undertaken this year for the first time. Commercial grape growing in Ontario is confined to the southern sections of the Province, where the seasons are long enough to ripen the leading varieties, and where the vines require no protection in winter. Grapes may be grown in other parts of the Province, if the vines are given winter protection, and the earlier varieties are selected which will ripen in the shorter season. The varieties selected for the experiment for Southern Ontario were: Concord, Wilder, Niagara, Brighton, Lindley, and Vergennes. This list includes some of the leading varieties of each color. The early ripening kinds selected for the central and northern part of the Province were: Champion, Worden, Winchell, Delaware, Lindley, and Moyer. Eighty-two lots were distributed for Southern Ontario and sixty-nine for Northern Ontario. One hundred and twenty reports have been received this fall on the results of the planting, 43 report all plants living, 19 report a total failure, and the others report that one or more of the vines have died. Ap-

parently the vines were not as fresh as they should have been when they were sent out from the nursery, and we intend to see that, if possible, better stock is sent out next year.

Cultural Directions.

1. Select a high, well-drained site, protected, if possible, from the strong prevailing winds, and prepare the land deeply and thoroughly.

2. When transplanting, cut back all torn or injured roots, to fresh, sound wood; avoid exposure of the roots to the sun or drying winds; dig the holes large enough to admit the roots without cramping; cover with moist, mellow, surface soil, and tramp firmly.

3. For convenience of trellising it will be best to set the vines about ten feet apart in one continuous row.

4. For a couple of years the vines may be allowed to run along the ground, but as soon as they make canes four or five feet in length, they should be trained to a trellis. A good trellis can be made of No. 10 galvanized wire, nailed to cedar posts. The posts should be about 20 feet apart and four or five feet out of the ground. The number of wires necessary will depend upon the system of pruning and training adopted. For the "Fuller System," described below, four wires will be necessary, the lowest one about a foot from the ground, and the others equally spaced between that and the top of the post. The "Kniffen System" requires only two vines, one half way up, and the other at the top of the post.

5. The "Fuller System" is recommended for those sections of the country where the vines have to be laid down for winter protection. With this system the vines are cut back at the time of planting to one or two buds, and only the strongest one of these is allowed to grow. At the end of the first year this cane is cut back to within a foot of the ground. The second year two of the upper buds are allowed to grow, producing two branches which are trained each way along the lower wire of the trellis. At the end of the second year these branches are cut back to within four or five feet of the main vine and become the two permanent arms. From these arms new canes are produced about a foot apart, and are tied up as they grow to the upper wires. Every year these are cut back to within two or three buds of the permanent arms, leaving not more than about three dozen buds on the whole vine when it is pruned.

The "Kniffen System" of pruning, as described below, is recommended for those sections of the country where the vines may safely be left on the trellis all winter. At the time of planting the vines is cut back to a couple of buds, and at the end of the first year it is again cut back to one or two buds. The next year the stronger of these is allowed to grow, forming a long straight cane. At the end of the second year this cane is cut back to about five feet in length, or enough to reach the top of the trellis, which by this time should be ready for it. This upright cane becomes the permanent part of the vine. The next year four arms should be allowed to grow from it, one on each side at both the upper and lower wires. These at the end of the season should be cut off just beyond the sixth or seventh bud. This upright vine of old wood with its four arms of new wood makes the full grown vine as it is left each year after pruning. From each bud on the arms laterals are sent out in the spring upon which the fruit is borne. These may be allowed to hang free without tieing. The annual pruning now consists in renewing the four arms by cutting out the old ones as close as possible to the main upright, and training in their places the strongest laterals nearest to the main vine.

6. In the colder sections of the Province, where the vines are liable to winter killing, they should be pruned in the fall, and be laid down and covered with a few inches of earth before winter sets in.

7. Do not allow adjoining crops to encroach upon the vines. To insure good growth it is best to give clean, thorough cultivation from early spring till about midsummer, after which the vines should mature their wood for winter.

8. A cover crop of some kind, such as rye, clover, or hairy vetch, sown after the last cultivation in midsummer, is valuable for root protection in winter, and to enrich the soil when it is plowed under next spring.

9. The fertility of the soil about the vines may be most economically maintained by the judicious use of leguminous cover crops, and occasional applications of unleached wood ashes, spread evenly over the ground as far out as the roots extend.

Experiments Nos. 10 and 11.—Apples.

Apples were sent out this year for the first time for co-operative testing. As with the grapes, two different lists of varieties were offered,—one

suited to the southern and central sections of the Province and the other to the northern sections. Those selected for the southern sections were: Primate, Gravenstein, McIntosh, Blenheim, Rhode Island Greening, and Northern Spy. This makes an excellent selection of varieties for home use to cover the season from the earliest to the latest.

For northern sections the list included only the hardiest kinds, such as Transparent, Duchess, Wealthy, McIntosh, Scott's Winter, and Hyslop Crab.

The trees sent out were thrifty one-year old trees. These are preferable to older ones, as the experimenter may then form the head at whatever height he chooses. For northern sections we recommended heading them down to at least two feet, as the trees are then less liable to injury from sun scald. In all 408 lots were distributed, 144 for Southern Ontario and 264 for Northern Ontario. Three hundred experimenters have reported this fall on the growth of the trees, 136 report all the trees living, and only 13 report a total failure. The others report that one or more of the trees have died, but on the whole, the experimenters have had good success with their planting.

Cultural Directions.

1. Select a high, well-drained site, protected, if possible, from the strong prevailing winds, and prepare the land deeply and thoroughly.
2. When transplanting, cut back all torn or injured roots to fresh, sound wood; avoid exposure of the roots to the sun or drying winds, dig the holes large enough to admit the roots without cramping; cover with moist, mellow surface soil and tramp firmly.
3. Set the trees far enough apart to allow for full development. This will depend largely upon the locality and soil. Observe the distance required for full grown apple trees in your neighborhood. In southern Ontario this will vary from 30 to 40 feet; in northern Ontario it will vary from 25 to 35 feet.
4. Form the head of the tree at whatever height you think best. In northern sections where trees are liable to sunscald, low heads with trunks not over two feet high are best. Prune the lower branches up to the desired height, and leave three or four main branches to form a well-balanced top.
5. Prune regularly every spring, thinning out as much of the new wood as may be necessary to prevent the top becoming too dense. Careful annual pruning avoids the necessity of cutting out large limbs when the trees get older.
6. Do not allow adjoining crops to encroach upon the trees. To insure good growth, it is best to give clean, thorough cultivation from early spring till about midsummer, after which the trees should mature their wood for winter.
7. A cover crop of some kind, such as rye, clover, or hairy vetch, sown after the last cultivation in midsummer, is valuable for root protection in winter, and to enrich the soil when it is plowed under next spring.
8. The fertility of the soil about the trees may be most economically maintained by the judicious use of leguminous cover crops, and occasional applications of unleached wood ashes, spread evenly over the ground as far out as the roots extend.
9. Guard against girdling of mice by banking earth against the trunks in the fall, wrapping the trunks with building paper, or tramping the snow firmly around the trunks from time to time after the first heavy snowfall.
10. Watch out for borers on the trunks near the ground every summer, and dig them out as soon as they are found to be at work.
11. Protect the trees against the ravages of insects on the foliage by spraying, or by removing the insects by hand until the trees get too large for such a method.
12. Experimenters wishing fuller information on any of these points, should send for our Bulletin on Apple Culture, which will be sent free on application.

In concluding this report, we may repeat what has often been stated before, that the real value of this co-operative work cannot be presented in any summary of the reports. Its greatest value naturally accrues to the individual experimenters who receive the plants and carefully conduct the experiments. Many are thus given a start in fruit growing who have never before given it any attention, and in making a start, they have a few of the

very best varieties to begin with, and, for their guidance in caring for the plants, they have the carefully prepared directions sent out from the Horticultural Department of the College.

Mr. McNeill: I think Prof. Hutt has done splendid work in distributing material for these experiments. It is inducing farmers to grow fruit for their own use, as well as giving them a general interest in fruit culture. This co-operative work has been the means of educating many of the young men in the methods of fruit growing.

REPORT ON FARM FORESTRY IN ONTARIO FOR 1906.

By E. J. Zavitz, O. A. C., Guelph.

Farm forestry is mainly concerned with the care of the woodlot, replanting waste land, and the formation of protection belts or clumps.

There is a general tendency towards more rational treatment of the woodlot. The work with which we are directly interested is waste land and protective planting. What we need is a demonstration throughout the Province of the practicability of redeeming waste lands and making them productive. It is hoped that through the efforts of members of this Union, many sections of Ontario may be reached by co-operative planting. (See Agricultural College Report, 1906).

When forest tree planting is better understood, there will be many who will be anxious to follow the work. Many confuse forest tree planting with orchard and roadside planting. We are accustomed to such planting, and when it is imagined that to redeem waste land similar work and outlay must be expended the task seems too great.

In waste land planting the size of the plants used and the method of planting, make it possible to stock an acre with a very small outlay, as will be shown later.

In order to carry out co-operative work it has been necessary to develop nurseries in which to produce planting material. We have now two nurseries producing stock of native and foreign trees. The one nursery is devoted to growing evergreens, and the other which is on heavier soil is producing hardwoods.

In the evergreen nursery we have the following plants:

White Pine 1 year old seedlings	150,000
White Pine 3 year old transplants	45,000
White Pine 4 year old transplants	15,500
Norway Spruce 1 year old seedlings	50,000
Norway Spruce 5 year old transplants	10,000
Scotch Pine 2 year old transplants	17,500
Scotch Pine 3 year old transplants	15,000
Arbor Vitae 1 year old seedlings	25,000

At present we import the seedling White Pine, Scotch Pine and Norway Spruce, and place it in the nursery for one year when it is ready for final planting.

In the hardwood nursery we have the following plants:

Tulip or Whitewood 2 year old	11,500
Tulip or Whitewood 1 year old	2,000
Box Elder or Manitoba Maple 1 year old	12,000
Black Cherry 1 year old	2,000
Hardy Catalpa 1 year old	30,000

White Elm 1 year old	22,000
Soft Maple 1 year old	8,000
Black Locust 1 year old	18,500
Red Oak 1 year old	12,000
Butternut 1 year old	200
Black Walnut 1 year old	500
Hickory 1 year old	1,000
Chesnut 1 year old	100

There are also at these grounds 40,000 Norway Spruce, three year old transplants, which will be transferred to the Holmwood Nursery for another year.

The evergreens are best suited to waste land planting, but frequently, in the better portions of waste land, hardwoods may be used. For general waste land planting native white pine gives promise of being most useful.

In the spring of 1905 two plantations were made, and in the last season or spring of 1906 about twenty plantations were started. These have been made in the following counties; Stormont, Durham, Simcoe, Ontario, Halton, Wentworth, Wellington, Brant, Waterloo, Perth, Oxford, Norfolk, Lambton and Essex.

A brief outline of the formation of two of these plantations will be given. In the planting done in Durham County, which is an average type of sand-land planting in the spring of 1905, about two acres were planted out of an eleven acre field. In the spring of 1906 this work was continued. The field was originally cultivated and cropped, but to-day all the knolls and more exposed portions are of drifting sand. This soil produced splendid tree growth originally. Upon turning over a few inches of the surface sand there is to be found plenty of moisture which makes it even ye a good tree soil as the tree roots extend down into this moist portion. Portions of the planting area were covered with a sparse growth of grass and weeds. The planting material used was Norway Spruce and native White Pine. The owner had collected about a bushel and a half of Red Oak acorns which were also used on the better portions of the area. The evergreens were taken from the express office to the scene of planting and heeled in by a small stream in a protected place. In the portions of the field which were covered with grass and weeds a very light furrow was skimmed out every five feet. This furrow answered two purposes. It made a planting line to follow, and more important, it gave the planting spot a better moisture content. The plant, being placed on the side nearest the thrown out sod, it is protected the first year from being overtopped by grass or weeds. It was afterwards found that in many parts of the area the furrows gathered leaves and other drifting material which formed a mulch for the plants.

The actual planting was done as follows: Planting holes were made by driving in the spade and moving it back and forth. The plants were inserted and the roots firmly covered by a boy who carried plants in a twelve quart pail half filled with muddy water in which the roots of the plants were submerged. Plants used were from eight to twelve inches high with a very compact root system. From seventy-five to one hundred plants could be placed in the pail at once. Plants were spaced about five feet apart in the row and the rows five feet apart, which would mean that an acre required 1,742 plants. The Red Oak acorns were dibbled in with a sharp stick or dibble and spaced the same as the trees. The actual work required about three men per day per acre for the White Pine and Norway Spruce. The acorns were dibbled in at a much faster rate, a boy planting an acre per day.

Another type of land planted was on a steep hillside in Perth County. The soil was of a loamy nature but very stony and had a dense turf. This planting differed from the sand-land planting chiefly in the preparation of the planting holes. The hillside was to steep to put horses on so no furrows were run. The planting holes were made about five feet apart each way. In making these spots a piece of turf was cut out from the side of the hill with a grub hoe or adze and the soil loosened and freed from stones with a pick. The planting mattock would answer best in such soil as it is a combination of pick and grub hoe. After the soil was loosened the plant was put in with a strong spade as in the sand-land planting, although more care had to be exercised to cover the roots.

This planting took about twice as much labor as the previous one owing to the time spent in preparing the planting holes. Frequently in hillside planting it is possible to run furrows which can be used as planting lines. These furrows should always be run parallel along the hillside rather than up and down in which case washing down the furrow might occur.

The question of outlay in this work depends upon the nature of the site to be planted. Rough hillsides with heavy, stony soils naturally take the most labor.

In the Durham County planting of 1905 about ninety-five per cent. of the White Pine has grown. The Norway Spruce gave poorer results, only about seventy-five per cent. living. The White Pine has passed the most dangerous period and the land is well stocked with trees.

This last season's planting seems to have withstood the summer very well although it is early to make a definite report on these. We expect to hear from some of the members at this meeting regarding the plantations on their own land.

If the members of the Experimental Union and Farmers' Institutes find replanting practicable we shall soon have co-operative plantations in every part of older Ontario.

Mr. Percy Reid: My knowledge of forestry is quite limited, but I may be able to say something of value to the meeting, because what I know is of a practical nature. We have ten or twelve acres of waste land on the upper end of our farm. It is sandy loam of a fair quality. It is not profitable to till it, and for many years it has not been broken up. The only grass that grows on it is white Clover and it is of very little value for grazing. Even this year, when there has been no cattle on it, the amount of grass that has grown has been slight, and for several years I have thought of trying artificial forestry on this farm as I have read considerable about it. I decided, at my earliest opportunity, to try what I could do, and this spring I obtained 3,000 white pine from Mr. Zavitz. I was very much surprised at their size when I saw them. I had thought of them as good sized trees. They were only about six inches high. We received the trees on May 9th, and I kept accurate account of the work we had in connection with planting; so that I know exactly what the plantation has cost. Our only cash outlay was forty cents for expressage. We heeled the trees in the same evening we received them. It only required about an hour for myself and one man to do so. We went to the bush near the planting ground and heeled them in on the bank of a little spring creek. We made a little trench, and taking the trees out of the moss we spread them out in the trench, spreading the roots out and covering them up, and they were left there until we were ready to plant. Two of us went up on the afternoon of the 10th and made furrows about five feet apart. Then the next

day the man continued with the plow, and in the evening the furrows were all ready, so that it took only a day and a half for the man and the team to do the work. The next day four of us took a one horse wagon and two pails and spades. We put the trees in the wagon and put some earth around them, and then put blankets over the trees to keep them from drying out. We worked in pairs, one man with a spade making the openings to put the trees in, and the other placing the trees in position and pressing the soil around them with his hands and then with his feet. We worked all day and we finished quite early the next evening, and that is all the time it took us to plant 3,000 trees, or an acre and a half of land. We measured the first two rows five feet apart, and after that we just guessed at it. I have been over the ground frequently during the summer, and I have watched the growth of the trees with great interest. Here and there you will see a dead tree, but very few. Some were washed out, and next spring when we re-plant we will do something to prevent them from washing out. They have made a very encouraging growth. Some of them have three or four inches growth on every twig. We intend planting more next summer because the ground is of very little value, and I think the trees will give us good returns. (Applause.)

Mr. Brown: I would like to ask Mr. Zavitz what steps are necessary to keep down the growth of grass?

Mr. Zavitz: If the soil is of a sandy loam type there is a very sparse growth of grass, and in that case you need to give no care whatever after the trees get a good start, especially where a furrow is thrown out. If the tree can get started the first season in fairly good shape, it will take care of itself. I think these white pine Mr. Reid planted will grow two or three feet next year. In heavier land, where there is a dense growth of weeds, it is advisable to go through in the summer and give them a slight inspection and cut back the weeds. I think you will have very little trouble on most waste land. We do not advise cultivation, but where you can cultivate for the first two seasons it is advisable to do so, because you will get better tree growth; but most of the farmers would not want to spend the time and, in real forest operations on a large scale, they never consider cultivation can be carried on economically.

Mr. Groh: We received our trees for planting about the third week in May. We found it did not take much labor to put them in. It took three men three days to plant this acre of land, it was very rough land. We were well pleased with the growth of the trees. Some of the trees were kept quite a long time before they were planted, and some of them became somewhat dried out, and we found those that we planted late made the poorest growth. After they were planted there was a period of drought of several weeks duration, but we did not find that that had affected them very much. The trees were planted on a hillside, on part of which lucerne was growing, and the trees which were planted in the lucerne grew just as well as the others. The first trees that were planted made very much the best growth; upwards of 75 per cent. of them grow.

The Chairman: I am sure we are pleased to hear these reports. It is certainly encouraging to those who are thinking of re-foresting. I would like to ask Mr. Zavitz if he has experimented with black walnut.

Mr. Zavitz: I do not think black walnut is a good waste land investment. It requires good soil to make good growth, and, even in the best lands, it would be years before you would get them of any value. Trees that are of commercial value are 200 and 300 years of age. If you plant them simply to get the nut it comes comparatively early. The trouble with

black walnut planting is that the nuts are collected and allowed to dry too much in the fall, and another factor is that, if the nuts are planted in the fall in a very wet soil, they are liable to decay. Sometimes they may start germinating, and then the cold wet weather comes on and they will decay, and then squirrels and mice will find them and take them out, even if they are two or three inches in the ground. The best method is to collect the nuts in the fall and store them so that they will not lose their moisture. Keep them over until spring, and plant them with a dibble or planting stick. We have on this farm a black walnut plantation of about a quarter of an acre. It was planted years ago, and great things were predicted of it. It was going to make a great asset for the Government in years to come. It has done well considering the location. You have to plant black walnut not mixed with other trees if you want to grow them to perfection.

The CHAIRMAN: How long before it would make enough growth to cut?

Mr. ZAVITZ: A tree fifty years old usually has a large percentage of sap-wood which is of no more value than a great many other woods. It is the black heart-wood that is valuable. A tree fifty years old would measure probably 20 or 28 inches.

Mr. SHERRINGTON: We have a man up in the county of Bruce who has several hundred black walnut trees. They were planted on a high hill, clay soil, in a row on the west side of his house. They were planted twenty-three years ago, and four years ago they measured from eight to ten inches in diameter. They will now measure from ten to twelve inches, and probably from forty to fifty feet high. They are planted in a double row about ten feet apart. They were cultivated for a few years and they are growing very rapidly. As to the amount of black heart-wood in them I could not say, but there seems to be no difficulty in getting the walnut to grow, and I think it can be grown successfully nearly anywhere in this Province.

Mr. ZAVITZ: For ornamental planting it would certainly pay to use the seedling. The fact that the black walnut grows here in Guelph is proof that it will grow almost any place in Ontario.

Prof. HUTT: I think it is a good tree to plant on a farm to produce nuts for the young folks. Certain trees have better nuts than others. I have seen walnut trees send out roots seventy feet away and they should not be planted near a hedge, or anywhere where they would affect the crops.

Mr. BROWN: Can you give any data as to the cost to the average farmer of making a forest plantation?

Mr. ZAVITZ: That is a hard question to answer. For instance I have found in the last year's planting that I would strike one place where the man and his boys were good workers, and they could put the trees in twice as fast as other men. I think on poor waste sand lands an acre can be planted in a day by two men who know how to plant. We supply the trees free of cost, but the express is paid by the man who received them. The rest of the expense is in the actual planting, and the care afterwards is a very small factor. Sometimes you lose 20 per cent. of the trees.

Mr. BROWN: Have you any estimate of the amount of land in the old part of Ontario that could be profitably made into forest land?

Mr. ZAVITZ: I have not, but I know that Norfolk county has a great deal of waste land along the lake. It is sand drifted soil. Durham county also has a large amount of drifting sandy soil, and many other counties have considerable areas of waste land which could be profitably used for

forest purposes. I saw a fine farm in South Perth where they had a gravel ridge that could not be cultivated, and that is one of the places where I made a plantation.

A MEMBER: Is there legislation that will allow the Province to take over land and make it into forest land?

Mr. ZAVITZ: The law will have to be changed before municipal planting can be carried out.

A MEMBER: In our county we have the lake shore, probably a mile wide, and it is growing up with poplar and spruce, and so on. That land has been sold over and over for taxes, and the people who buy it keep it a year or two and then it is sold again and it seems to me that, if our township could take that land over in their possession and protect it, it would be a very short time before it would be a forest. This Experimental Union brought up the question of Municipal Forest Reserve. I think as soon as we can get a Forestry Bureau in Ontario this can be carried out successfully, but I do not think we can do so at the present time. In Europe there are many municipal governments which have no tax simply because they have forest possessions which give them all their revenue, and I think there are many counties in Ontario where they could almost get the revenue 100 years from now, and that is something the state should look foward to.

Mr. PETER GRANT: Would not planting trees five feet apart be too thick?

Mr. ZAVITZ: Close planting is done to give the trees clean stems, free from branches. In Germany they plant the Norway Spruce as close as three feet apart. They will naturally thin out.

Mr. GRANT: Four years ago I put in an acre of maples and other trees, and I put them eight feet apart and I find they are too close.

Mr. ZAVITZ: Do you want a grove or do you want timber?

Mr. GRANT: I want timber.

Mr. ZAVITZ: I would let them crowd all they will. You want high growth, and if you plant them far apart you will not get high growth; you will get a spreading growth.

A MEMBER: When I went on the farm where I live, there was possibly ten or twelve acres where the wood had been taken off. The man before me intended to clear it but did not do so, and I thought I would leave it. The under-growth is probably seven years old, and I find it is almost a natural forest; beech, maples, and bass-wood and elm, and I have trees there that are probably thirty feet high. The crowding system took place and the weaker ones went under and died. I have good straight trunks of twenty-five feet. The under limbs all rotted and dropped off. I had another piece of land of about ten acres that was waste land and it grew to a cedar swamp. It is now about twenty-two years old, and I can go to that swamp now and take out as many posts as would fence my farm. Of course they are not up to the standard of being large posts but, I think, in the space of three years the cedar swamp will have enough posts to fence my farm. The longer that cedar swamp is there the bigger the timber gets, and I think, if the larger trees were taken out, it would keep up indefinitely.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN POULTRY RAISING.

By W. R. Graham, O. A. C., Guelph.

For a number of years we have been conducting co-operative experiments with incubators. The science of incubation, or, as some style it, the art of incubation is not fully understood. Incubation is influenced by so many things that it is often very difficult to locate the exact cause or causes of failure or success. At the Poultry department this season we have been making careful observations in natural and artificial incubation. We find that the hen does some things that an incubator does not do; for instance, the air surrounding the eggs contains more moisture than many incubators. We have found that one hen's eggs differ from another in the strength of the germs, the porosity of the shell, etc. Some hens lay eggs that will hatch under almost any conditions, while other hens lay eggs that require nearly ideal conditions. We find plenty of birds in the latter class; hence, in order to get large hatches of chickens that live, we shall find it advantageous to study nature. During the past year we have had a number of poultry raisers making incubator tests under our direction. Instructions were furnished to each experimenter, also a blank form on which to report results. Reports were received from ten experimenters in all. Most of them filled out the forms in detail, but we had a few who failed to let us know how many chicks were alive at two weeks of age. It is, of course, desirable that we should get as large a hatch as possible, and it is also desirable that the chicks be strong and healthy.

The majority of the experimenters operate their machines by the "dry method," that is to say, moisture is not applied artificially throughout the hatch. We had two experimenters who were operating the same make of machine, and both used moisture; one reports an excellent hatch, the other a hatch rather below the average. As is usual in such cases, one operator praises moisture, and the other condemns the use of moisture. From the information given on their respective cards I would judge one's success and the other's failure was largely due to the quality of the eggs.

Our experiments at the Poultry Department so far do not go to show that the use of moisture under ordinary conditions either helps or retards a successful hatch. What effect moisture may have upon the vitality of the chicks is another question, and one upon which we hope to get some information from our experimenters next season.

From the reports of the experimenters for this year we find that about 80 per cent. of the eggs set were fertile. The average hatch is 41 per cent. of the eggs set, or just about 50 per cent. of the fertile eggs. Of the chickens hatched about 70 per cent. lived past two weeks of age. Some experimenters raised a much higher percentage than others. For instance, one man who hatched 495 chickens, raised past two weeks of age, 89 per cent. One fell as low as 42 per cent. There are several causes, some of which are supposed to be due to feeding, others to bad breeding, etc. In one case the brooder lamp went out. We did not get sufficient information for us to arrive at any conclusion as to whether moisture, as applied during incubation, affected the vitality of the chicks or not. Next year we hope to have more detailed information along this line.

A Lady Member: They give us very explicit instructions about the air cell, that should be a certain size; are we to understand that there is nothing in this?

Mr. Graham: Those charts sent out with the incubators are absolutely useless; there is not an incubator manufacturer in the country who thoroughly understands the scientific part of the business. The incubator men are watching our experiments much more closely than anybody else.

Q.—What about the handling of eggs during incubation?

Mr. Graham: I do not think it makes any difference. These eggs were weighed every day, sometimes we carried them half a mile before we weighed them, and they were carried in all sorts of baskets and hats, etc.,—whatever was convenient at the time—and some days the eggs that were under the hen were marked to find out whether she turned them, and if there is any harm done to an egg by bumping them. These eggs certainly got the bumps.

REPORT OF THE COMMITTEE OF AGRICULTURAL CHEMISTS.

By Prof. R. Harcourt, O. A. C., Guelph.

Your committee have to report that fertilizer experiments were carried on with three classses of crops, namely, oats on swamp soils, market garden stuffs, and sugar beets.

Oats on Swamp Soils. Last year a report was made on the results of fertilizer experiments on swamp soils, and it was decided to continue the work. This year seven experiments were placed with the oat crop on swamp soils. Each experiment consisted of four two-square-rod plots. They were aranged as follows: 1 Potash, 2 Thomas phosphate, 3 Potash and Thomas phosphate, 4 no fertilizer.

Unfortunately, the excessive wet weather caused the loss of all of these experiments. Naturally the ground used in these experiments was rather low, and it was the first to suffer from the wet weather.

Market Garden Crops. Twenty-two experiments were placed, with onions, cauliflower, potatoes, and celery. Each experiment consisted of two plots, each of which was two square rods in size. One was treated with a mixture of nitrate of soda, superphosphate, and muriate of potash, and the other was left untreated. These experiments were principally with the market gardeners in the neighborhood of Toronto. On visiting the experimenters during the season, I found that the land on which these experiments were placed was originally swamp soil, and in some cases had been treated with as much as fifty to one hundred tons of farmyard manure per acre for twenty years or even longer. On these soils fertilizers gave no increased yields. On a few plots placed in the St. Catharines district some increased yields were obtained, but the reports are so few that no statement will be given at this time.

These experiments cannot be said to be a failure, in that the fertilizers gave no increased yields; but had I known more of the nature of the soil that was to be used in the experiments, I should have planned a different mixture of fertilizers. I have recommended the growers in the Toronto section to use lime to correct the acidity which is developing in these soils. I am inclined to think that the use of such large quantities of farmyard manure is not good, and that if at least half of it was replaced by mineral fertilizers, better results would be got from these soils.

Sugar Beets. Seven farmers signified their willingness last year to carry on co-operative experiments with fertilizers with the sugar beet crop. In order to make the experiment simple, and to get results directly from

the factory, the experiment was made to consist of two plots, a fertilizer and a no fertilizer plot. Each plot consisted of one acre. The fertilizer plot received—

300 pounds of superphosphate, 100 pounds of potassium sulphate, 75 pounds of nitrate of soda.

The instructions were that this amount of fertilizer should be applied in addition to the regular treatment of the rest of the field.

Through the kindness of Dr. Shuttleworth, of the Ontario Sugar Company, Berlin, Ont.. arangements were made that the beets from each plot were to be delivered separately at the factory, and the weights and the percentages of sugar were determined in the usual way at the factory. Six good reports were received, one experimenter failing to apply the fertilizers as directed. The results are embodied in the following table:

Experiment.	Yield per acre tared weight lbs.	Sugar, per cent.	Value.	Difference.
			$ c.	$ c.
I. Plot 1	15,576	13.8	35 78	
" 2	20,312	14.0	*47 32	11 54
II. " 1	23,738	14.5	57 24	
" 2	26,714	15.0	66 78	9 54
III. " 1	30,251	15.3	77 14	
" 2	31,777	14.8	78 23	1 09
IV. " 1	22,370	15.5	57 77	
" 2	24,746	14.8	60 92	3 15
V. " 1	25,838	15.4	†66 27	
" 2	29,403	15.0	73 50	7 23
VI. " 1	20,862	13.8	47 88	
" 2	21,500	14.4	51 49	3 61

* The total value of fertilizers was $7.80.
† No nitrate of soda was used. Total value of fertilizers, $5.55.

It will be seen that in three cases out of the six fertilizers gave sufficiently increased yields to pay for the cost of the fertilizers, with the first crop. It is quite probable that the potash and phosphoric acid will show results in yield in the crops following, so that results indicate that in these cases at least the fertilizers gave economic results.

This year the work has been continued with five experiments, but results have not yet been received.

The CHAIRMAN: Would you think it advisable to plant crops the succeeding year and keep a record?

Prof. HARCOURT: I think that ought to be carried out. If we are going to get at the full value of the experiment we must know something about the second crop. We must know what there is left in the soil for future crops and what it is worth, and we can only do that by experimental work. After all, in connection with fertilizer work, each man has to experiment for himself.

Mr. REEVES: I do not think the experiments were a failure this year. It is not the intention to drop these tests. One result of Prof. Harcourt's visit to us is that we think we found out one thing our land requires that we did not know before.

Prof. HARCOURT: These were largely swamp lands lying between sand hills which had been cleared up and then manured with from 100 to 150 tons of farmyard manure per acre for 20 years, so that it seemed rather a waste to use chemical fertilizers on some of them.

The CHAIRMAN: Did you take into consideration early maturity?

Prof. HARCOURT: Yes, that was one point we wanted to bring out, not only the effect of the fertilizer on the yield, but also on the quality of the crop and on the earliness of maturity. One thing the sugar beet growers liked about the experiment was that they were able to thin out three days earlier, and they were therefore that much ahead of any weed life that was there, and that made a difference in the crop.

Mr. REEVES: Would an ordinary vegetable crop forced by commercial fertilizers have as good keeping qualities as a crop not forced in that way?

Prof. HARCOURT: I think where a crop is forced with nitrogen it reaches maturity earlier, and it is doubtful if it will keep as well as if it had been grown without nitrogen.

THE INTRODUCTION OF VEGETABLE TESTS IN CONNECTION WITH OUR CO-OPERATIVE WORK.

By Prof. H. L. HUTT, O. A. C., GUELPH.

The subject announced is one that I have been thinking of for some time, but as we were not yet prepared to undertake co-operative tests with vegetables, I have said nothing about it. There seems to be a desire on the part of some of the vegetable growers, however, to have such taken up by the Experimental Union, and for that reason I have been asked to introduce the subject for discussion.

My own opinion is that it would be an excellent thing, but before it can be properly undertaken there are a few things which should be considered.

In the first place, it would be best to have at least two or three years' careful work along this line at the College, upon which to base our selection of varieties for distribution and further tests throughout the Province. This is the first year we have ben able to make extensive tests of vegetables at the College, and although we could select a number of varieties of the various classes of vegetables which stand out prominently as good ones, still it is not well to put too much reliance in a single year's test. We would like to have as firm a foundation upon which to base our co-operative work with vegetables as we have had in our experiments with fruits and farm crops.

Another matter which must be considered is the item of expense. Before such work can be extensively engaged in, we will require a considerable increase in our grant. Probably this can be managed. I think it will be best, however, to begin on a small scale and gradually extend the work, as has been done in all the other branches of this co-operative work. It would hardly be safe at first to make a general announcement that we intend to distribute vegetable seeds for testing, for no doubt as soon as such became generally known we would be swamped with applications for seed.

I mention these as a few of the things which should be considered, and would be glad to hear what others may have to say on the subject.

The CHAIRMAN: I think this is a very important matter. There is a great field for work along this line and we would be pleased to have the subject freely discussed.

Mr. W. J. BROWN: I understand that Prof. Hutt desires to postpone co-operative work with vegetables for a year or two. It seems to me it might be possible to start this work sooner if the Vegetable Growers would appoint a committee to advise with the Director of this work and throw the responsibility upon the Vegetable Growers' Association and let them select a certain experiment that might be undertaken this year. I know from discussions carried on at the Vegetable Growers' meeting that there seems to be a feeling on their part that something ought to be done at once.

The CHAIRMAN: I am a member of the Vegetable Growers' Association, and I know there is a feeling that they want to get started at something, but have not yet any definite idea of what should be done. With Prof. Hutt, I am of opinion that we should make a good start, and that the work should be mapped out clearly and then undertaken in earnest.

Mr. THOMPSON: I think if there is money for the purpose, that it would be wise that some tests of known varieties might be inaugurated this year in order to start the ball rolling.

Prof. HUTT: We have been conducting some co-operative vegetable tests this year, but not in connection with the Experimental Union. We selected a dozen varieties of tomatoes for this work. We wrote to the tomato canners, and got them to give us the names of the leading tomato growers in their respective districts, and these men were asked to co-operate with us in making tests of tomatoes. Our object was to find out the best varieties from both the growers' and canners' standpoints. We asked the canners to report on the quality of the different varieties from the canners' standpoint and the growers from the growers' standpoint, and we have a number of reports from various districts all the way from Picton to Amherstburg. Besides the results of the work here referred to, we have our own experience with tomato tests here for the past ten years, and I think with such a basis to select from we could safely undertake tomato tests in connection with the Experimental Union work at once, and if thought desirable, we might also add one or two of those crops, such as beets, carrots, and lettuce, with which we had extensive tests here this year. I do not wish you to get the impression that I am anxious to postpone this work any longer than is necessary, but I want to be sure that when we make a start, we make no mistakes.

Mr. HOLTERMANN: Could not the work that was done during the past year be transferred to the Experimental Union? It seems to me that as far as possible we would like to meet the views of the Vegetable Growers' Association.

Mr. SHERRINGTON: I think this matter should be left to a special committee to be appointed right here at the present session. This work requires very careful thought, and a plan should be worked out whereby it could be carried on. We have a Horticultural committee here and also some of the members of the Vegetable Growers' Association, and there ought to be a committee appointed to map out the work on a small scale.

Mr. REEVES: So far as the members of the Vegetable Growers' Association are concerned we would like to have experiments conducted, but we want to know how they are to be conducted and by whom. So far as the Experimental Union is concerned, I have only been able to gather slight information with regard to it, and we came up here merely to see in what

way the experiments are conducted. Of course we have to report to our Association at their annual meeting in January. We are merely a committee to see what opinions we can gain along this line.

Mr. Delworth: We are here to-day as representatives of the Vegetable Growers' Association in response to an invitation received from your President. We will be most happy to listen to any suggestions you may make regarding vegetable experiments, but we have no authority from our Association to ask the Experimental Union to conduct vegetable growing tests either by yourselves or in co-operation with us. We will be most happy to hear what you have to suggest to us, and we will report to our own Association—

After some further discussion, Prof. Hutt, Mr. McMeans, Mr. Robertson, Mr. Holtermann, and Mr. Buchanan were appointed a committee to confer with the representatives of the Vegetable Growers' Association. At this meeting, plans for conducting co-operative tests with vegetables were discussed. The representatives of the Vegetable Growers' Association expressed a desire that this work be undertaken by the Union, and the committee for the Union explained that it was intended that such work be taken up as soon as the experimental work conducted at the College would furnish sufficient basis for selection of varieties for experiments. It was explained that from the work already done last year, experiments might be taken up this coming year with such crops as beets, carrots, lettuce, and tomatoes, and if the interest shown in the work warranted it, other crops would be added to the list in due time. This seemed to meet with the approval of all present, and the Vegetable Growers' representatives promised their hearty co-operation.

OUR COMMERCIAL FRUIT INTERESTS.

By A. McNeill, Chief of the Fruit Division, Ottawa.

It would be very easy to say some pleasant things about some of the people I see here to-day, and how they have helped to develop the fruit industry, but I will leave them, and say a few words on how I think the industry can still be developed. For that purpose I think we might very well divide the fruit business into two great sections: the first, what we call the "tender" fruit industry, and the other the "hardy" fruit industry. It divides not only the industry itself, but very fairly divides the geography, so that, in dealing with one particular class of fruit, we can also deal with particular sections of country. The tender fruit industry here in Ontario is confined largely to the eastern counties along the north of Lake Erie, including the counties on the west end of Lake Ontario. There you have a region in which can be grown to perfection the peach, the plum and the cherry, and small fruits and all kinds of vegetables suitable for canning purposes, so that the great canning industry and the tender fruit industry are confined largely to this section. I said this section was one of the most favored sections in Canada; I might say in the world. I know of no place, as far as climate and natural suitability of situation are concerned, that has greater advantages; and I predict that if you will but develop the advantages this district has, there is no part of North America that can be more prosperous, or that is situated so as to develop a finer race of men and women than the southern counties of Ontario. I do not think this section will do itself justice unless it develops very largely an early fruit and

vegetable industry. We do not need to be politicians, or to have a very wide grasp of economic questions, to recognize the fact that for many long years to come this country is going to be to a certain extent protective, and that this protection is going to aid a little in the development of this early fruit business. This southern tier of counties is over two weeks ahead of the rest of the Province in the market with fruit; it has two weeks advantage in point of time. The county of Essex and the Niagara District harvested strawberries somewhere from the 6th to the 10th of June, and that is certainly two weeks ahead of the local berries about Ottawa, we will say. During these two weeks Ottawa will take from one to two carloads of strawberries every day, and so on with the rest of the fruit and vegetables. I need not waste time in stating to you that this southern tier of counties would grow enough fruit, if properly managed, to supply the needs of Canada for many a long day to come, and when farmers in the district referred to, give up the coarser and less productive fruits and adapt themselves to the growing of the finer and the more profitable crops, such as early vegetables and early fruits, there will be an entire change, I think, in the population, and in the general comfort and style of living, that goes along with the greater profit and greater skill that is necessary in this particular trade.

Now the question comes, have we the markets that will take this stuff when it is grown? I can simply say that there is no market that I know of that has a ready supply except the distinctly local markets. The local markets in the immediate neighborhood of this southern tier of counties are, I think, supplied and sometimes over supplied; but the distant markets—and by those I mean markets seventy-five, one hundred, and two hundred miles away from where the products are grown—are not supplied at the present time. One of the constant complaints that I hear from merchants in Ottawa and Montreal is that they cannot get the material they require. In this matter of small fruits they are looking, and anxiously looking, for the proper development of this trade, and it has not come yet. They say: "Why are your fruit growers so slow; why don't you open up this trade?" There is a splendid opportunity in the small fruit business. The trade is simply in its infancy. There is not a single market that I know of that is anything like supplied.

Then, to come to the markets of the great North-west; the small fruits can never be produced early enough in the North-west to compete seriously with southern Ontario, notwithstanding the handicap of the freight rates. I therefore regard the markets of the west as certainly within reach of the growers of Ontario, although possibly we are not within reach of the demand at the present time. I am not hopeful that we are going to have an immediate development of the tender fruit industry. It will not do to spread this trade over a large area, a little here and a little there; it will never work. We want to have the fruit grown in large quantities at particular points, because we will have to ship the fruit in car-load lots. We ought to have car-loads of strawberies. At the present time there are markets that will take car-loads of strawberries if we can furnish one solid car-load of one kind of package and one kind of berry. It would require something like 800 crates to fill a car with strawberries, and there are not enough growers in any one locality to furnish 800 crates per day at a single shipping point.

Another very necessary requirement is continuous supply. It will not do to limit yourself to a particular need. You must have a continuous supply of stuff in order to hold your customers, and in order to secure proper transportation; for that reason I would strongly recommend that fruit growers move along with their industry. Take early vegetables; there is no

place that can do this better than the same tier of counties. Wellington has developed this early vegetable trade. The early vegetable come in first, and they form a splendid introduction to the fruit that comes on a little later in June, July, August and September; and those that have control of these matters ought to endeavor to get their neighbors to grow the same early stuff in order that they may have a continuous supply of material to hold their customers, and to secure proper transporta ion.

If this region lives up to the advantages it possesses, it must have men in the neighborhood who will look upon this question in a proper way, and the whole neighborhood should unite for the purpose of developing along these lines systematically. I am sorry to say this is one of the most difficult parts of the whole problem; this question of getting fruit men to work one with the other. There is such a spirit of jealousy. There has been a wrong ideal developed among the people on this continent; perhaps less in Canada than in the republic to the south of us. Instead of developing a society, every man says, "I am independent. I am in the world for myself. I stand alone. I am self-sufficient." That is all wrong. We must get away from that idea of society. We must recognize that the basis upon which to build any civilization that is worthy of a country like this is social not individual; and such a change of ideal lies right at the basis of this problem of co-operation among fruit men. Along with this development of the early vegetables and fruit trade will come the development of the canning industry.

Now, I want to say a word or two with regard to the hardy fruits. I have spoken so far simply of the southern tier of counties along Lake Erie and the north-west end of Lake Ontario, and a little strip along the northern shore of Lake Ontario, Prince Edward County, for instance. I want now to say a word with reference to the hardy fruit belt of Ontario, for, after all, the great fruit industry of Ontario has to do with hardy fruits; such as the apple, that king of fruits; and I want to say just a word or two directing your attention to the advantages and the possibilities of the trade in this fruit. There is a section of country just north of that tier of counties we have been speaking of, including the counties on Lake Huron and the middle counties of Lambton, Middlesex and Brant, but not including that heighth of land in the county of Dufferin and Perth and the southern portion of the county of Grey. That high land is not particularly suitable for winter apples. The climate is just a little severe and every portion of it is not perfectly safe for orchards. Unfortunately, our winter apples are tender, and it is only the early apples that are hardy; in that region bordering on Lake Huron, extending back as far as Walkerton or a little further, and perhaps including Guelph, I rather think the climate is a little severe to be within the genuine winter orchard belt. But, leaving out this high land, we have yet an enormous belt of land extending from Lake Huron right through to the county of Frontenac, along the north shore of Lake Ontario that can grow winter apples to greater perfection, all qualities considered, than any part of the earth's surface. That is a high claim but it is true. The State of New York has been celebrated for its apples, and justly so. As far as the color, size and flavor is concerned, no man can find much fault with the apples grown in New York State; but when it comes to the keeping qualities of the apples grown in New York State and the southern counties of our own Province, they will fail in this essential quality that they will not keep. That is just the truth of the matter. I know I have been accused of slandering the southern tier of counties, but we should not mince matters. Apple buyers avoid that section when they are buying their stock. Even this year

these people to the south have, some of them, sold their apples at 50 cents a barrel, while people growing the same variety of apples in this winter belt have been getting $1.25 and $1.50 a barrel for the bare apples without packing. They get twice and sometimes three times as much for their apples in this winter belt as they do in the south. If the apple buyer attempted to store Spys, Baldwins, and similar varieties grown in southern Ontario or New York State in the ordinary storage, they would suffer a shrinkage of 10 to 25 per cent. The apples grown on Georgian Bay can be put in ordinary storage, and can be held until the price is higher, with a shrinkage of only from 5 to 6 per cent., or, at most, 8 per cent., and in some places they have a shrinkage of only 2 per cent. I think there will be 25 per cent. of shrinkage in apples grown on the southern belt, and that simply means that the people in this winter belt in this region north of Lake Ontario extending through to Lake Huron have the advantage of the price of cold storage, which is just about 40 cts. per barrel. You can easily see why the orchards are flourishing, and why the apple growers in this belt have made such large profits. They have this advantage of 40 cts. per barrel, and the business fits in admirably with mixed farming. It would not be at all impossible to double the value of the farms in these counties by planting orchards. Do not worry about markets; they are going to extend very much faster than we can possibly supply them. Everything points that way. We have every advantage, and I know of no man who looks into the future, but who will agree with this statement that the markets are going to open much faster than we can fill them. There is no danger of there being a surplus in this section. You can simply put the apple growers of the southern district out of business; they do not compete with you because the apples they grow are used up before yours come into the market.

I am very much in favor of a system of mixed farming. I believe here and elsewhere we will find the highest type of men and women are developed by mixed farming. I am not talking only in the interests of the fruit industry; I am keeping in view the general development of the Province, and I believe you can develop men and women better by a system of mixed farming than you can in any other line of farming. Put ten acres of orchard on every farm in this winter belt. You can get land for $50 an acre, and for another $50 you can put an orchard on it. When the trees have reached the age of ten years the orchard will become, not only self-sustaining, but an interest bearing proposition. I know what I am speaking of, because I have been planting trees for a number of years. I am the owner of about three thousand trees now, and I am proud to say no hand has touched any one of these three thousand trees but my own, and some of them are five years old. I feel a pleasure in it, I know what it costs, and I can say confidently that I can grow an orchard up to the age of ten years, and, counting the revenue that comes from the soil and giving full credit for that, it will not cost more than $50 an acre to grow the orchard. When I have it there, what have I got? I say $500 an acre is a moderate price for an orchard in full bearing, and many men value their orchards at $1,000 per acre. With an expenditure of $100 for land and trees, and waiting for ten years, you have an increase of from $500 to $1,000 per acre. That means another family upon every farm, doubling the population, and better facilities for living. I maintain that the ideal condition of society is not manufacturing. Humanity must go down, and it is going down, when it is exclusively confined to manufacturing towns. Manufactories could never exist were it not for the draft they make upon the agricultural sections. Manufacturing towns are simply great whirlpools that swallow up the population

that come into them from the country. The raising of live stock, or any special kind of farming, is not the best thing for the country. I advocate the development of the natural advantages we have in this belt of Ontario. I think it will increase the population and be the best thing for the country as a whole. I know of no branch of farming that affords better opportunities for young men than fruit growing under proper supervision and under proper circumstances. Do not attempt to do the early fruit business away in the north, and do not attempt to grow winter apples in the south, but use your brains and develop each portion of country according to its natural advantages. I know of nothing that affords better facilities from a financial standpoint.

I sincerely trust that in the near future we will have the revival of this industry, which we sorely need.

Mr. Robt. Thompson: I heartily agree with what Mr. McNeill has said. In past years, in my own county, some of the farmers have said, "Do not talk too much about fruit growing, because we will have too many fruit growers and prices will go down." There are many portions of this Province where some kinds of fruit can never be grown commercially, and no matter how much fruit is grown in these older sections it will only create an appetite for fruit elsewhere. I think fruit is one of the most healthful foods we have, and I do not think it is used enough. From New Year to New Year we should have fruit on our table available all the time. Our home market is gradually increasing, and I doubt if we can keep pace with the demand in the North-west. We have heard it said that British Columbia is going to come in and capture that market. We hope they will be able to produce large quantities of fruit, but, no matter how fast they increase, they will not be able to supply the demand, and they will not be able to compete with us in certain lines. When I read in the papers about young men leaving Ontario—sometimes the best of our citizens going out into that section—I often think that a great many of them would be better at home. They might not make quite as much money at home but they would have a better life. We, in Ontario, are keeping the bright side turned down. I know this is the case in a good many instances. Farmers do not want to say how much money they are making on their farms. Possibly ninety-nine one-hundredths of the fruit growers do not want to say how much they make out of the fruit crops in the year because they are afraid of competition. People in the city think fruit is grown for nothing, and they think there is no harm in coming out of the city with their baskets and going into an orchard and taking fruit. Where fruit is grown you will find they have the most advantages, and fewer of the young men leave their homes and go to other parts of the country. I think that if more attention was given to our fruit industry, it would help to solve the problem of keeping young men on the farm. In the county of Lincoln, and the adjoining county, we have very little trouble with our young men leaving the farm. I have thought seriously over this, because I have only one boy, and I have often said, "If that boy would leave the farm my interest in life would be largely gone." And, thinking of him, I naturally think of my neighbor's boy, and I can say honestly that very few of them are leaving the farms; and more than that, we find that the farmers and their sons are leaving the less favored sections and coming into our county. The majority of farmers of this Province do not realize how much fruit they can grow on a farm. Professor James points out the fact that, according to statistics, there are 7,000,000 apple trees in this Province. The estimated crop on these trees in the year 1904 was some 50,000,000 bushels, and, out of that great crop,

only a comparatively small amount is sent out of the country. I believe over one-half of our apple crop is wasted. In the autumn of 1904 the fruit growers in our locality sent two car-loads of apples to the North-west in charge of Prof. Reynolds, with the understanding that we should receive exactly what the apples sold for. The Professor came back and reported, and I believe nothing has done so much good to the fruit growers ot St. Catharines as that one small transaction. As a result, the next year these fruit growers made up their minds that they were going to send out regular shipments, and some eighteen or twenty cars were sent out the next year. Some got good prices and others did not, but we learned the cause of the failures, and this year we followed it up with sixty-four cars, and it has been a grand success. I believe the North-west will take every pound of fruit that is grown in the Province of Ontario, provided it is put up in a proper way. The price of fruit was never better in our section than it has been this year. We started in on the 7th of August, and from that to the end of the year, we have been sending the fruit along, and I know that farmers have put in from fifty to one hundred baskets of apples, and they have averaged from 50c. to 90c. a basket. Of course those who put their apples in boxes receive more money. We could not supply the demand, and we had to refuse orders for boxes and barrels of apples.

I am sorry to say that there are a lot of apples sent out from this Province to the North-west that should not go there unless they are properly marked. I think that a lot of men, who are exporting apples, are sending their culls to the North-west and the best apples to the Old Country. What you students want to do is to realize that there is more money in apple orchards and small fruits than you think. The majority of orchards in the country are not pruned and sprayed as they should be.

There is an unlimited market in the West for red and black currants. This season we had to refuse orders for 200 baskets of red and 200 baskets of white to be shipped twice a week to a town in the West, and that town is right at the door of British Columbia. It will be twenty years before there is any danger of competition from British Columbia, and the competition will never be serious with certain Ontario fruits. In every town from Calgary to Winnipeg, when I asked the dealers about our Ontario apples, they said they preferred the Ontario apples if they could depend on the packers. They liked them better than British Columbia apples, because they had a better flavor and better keeping qualities. When I was in British Columbia I got a liking for their fruit, but when I got back to Ontario and saw our apples, I said I would have given $10 if I could have had a basket of them with me when going through British Columbia. We can show better fruit and more of it than they can in any other Province of the Dominion.

The CHAIRMAN: It is not what we grow that we make our money out of, but what we grow and market successfully. The reason why so many apples are wasted is because they have no system of shipping, but now that we have co-operative shipping societies, we are able to ship our apples to better advantage. Mr. Sherrington is at the head of one of those co-operative institutions, and I would ask him to take part in the discussion.

Mr. SHERRINGTON: This is rather a wide subject. The fruit situation has been somewhat neglected for a great many years, especially the market side of it and the care of the orchard. Our orchards have not been properly cared for, and we have too many varieties of apples in this country. What we want is a large, well-colored apple, and of the best quality that can be got. I handled this year about twenty-five cars, and in some cases our old

standards have been the Spy and the Baldwin. Sometimes, however, Russets have constituted two-thirds of my shipment. In making up car-loads we can never realize the same price when we send a number of varieties as we do when we send a car-load of one variety. What we recommend to anyone who is planting an orchard is to plant only one or two varieties. Spys, Kings and Baldwins always sell for good prices. I had twenty-four varieties in one car, and what can you do with cars of apples of that description? You can only get one-half the price you could get for a car of Spys or Baldwins. By means of the co-operative movement we have overcome that state of affairs to a great extent, and we can now find a market for these different varieties at a fair price, but we have to have a sufficient quantity to select from. I would strongly advise growers to be careful in planting for future use, and I would advise top grafting these undesirable varieties.

A MEMBER: Is the Ben Davis an undesirable apple?

Mr. SHERRINGTON: I have always upheld the Ben Davis. It is an apple that sells fairly well, and is a good keeping apple and it makes you money; but I would not advise you to eat it excepting in the proper season. It is not good for the local market, but it looks nice, and if you ship a barrel of Ben Davis to Europe and a barrel of Spys, the Spys will not reach the European market in as good a condition as the Ben Davis.

Another point is as to the methods of handling the apples and other fruit in this country. The desire of the dealers is to make money out of the fruit, and they do not seem to have any interest in the consumer. Therefore, I think the growers themselves should take hold of this trade, and see that the fruit is put up in proper packages and in an attractive manner, and with greater uniformity. There is no way it can be done better than under the co-operative system. I am glad to say that I think, that in the course of a very few years the whole of our fruit industry will be handled under the co-operative associations. It has given entire satisfaction wherever tried. The local fruit growers' association asked me if I could find a market for their fruit this year, and I said "Yes." They are all farmers, not exclusively engaged in fruit growing, and I have sold for them this year 2,000 barrels of apples; and all we sent were in first-class condition. We have made up our minds to build up a reputation from the start, and we put in nothing but first-class apples and put them in first-class barrels.

READING IN THE FARM HOME.

By Prof. J. B. Reynolds, O.A.C., Guelph.

The farmer's interests, if he is up-to-date and intelligent, are manifold. First he has his business interests, then his public interests, and his social interests.

Now, in informing himself with respect to his business, there are various means besides that of reading, but in reading we should perhaps place the agricultural paper first in importance. The agricultural paper, while not so scientific nor so accurate as the text book or the bulletin, nevertheless it is up-to-date and practical. It deals with the immediate interests and needs of the average farmer. Its columns are filled with contributions from men of experience, and the editorial pages are written presumably by men of wisdom and of wide outlook. A first-rate agricultural paper ought to be indispensable in the farmer's business. Books, by being placed

second, are not by any means considered of little importance, but a book, no matter how good it may be, is likely in a short time to be out of date. Nevertheless, certain standard works on agriculture should be in every farmer's library, and the best use to make of these books is as reference works. Presumably a text book on agriculture is scientific and accurate. If the question of feeding, or of cultivation, or of selection of seed for certain conditions comes before the farmer for solution, he should know where in his text book to find what he requires. This use of the text book, namely of reference, is a far higher advantage than merely to read the book from cover to cover and then to lay it aside as finished.

The farmer who is merely a farmer is not living up to his privileges. A farmer may be none the worse in his business if he is at the same time a public-spirited citizen, but in order to be the latter, he must be intelligently acquainted with public questions. He should be informed on public questions which relate particularly to his own business, namely, the tariff, the control of markets, the marketing of produce, and trade and commerce. Also, he should be acquainted with the wider public questions that affect the welfare of the country, such as public ownership of public utilities, and of purity in elections. These propositions do not need arguing; they will be conceded by every reasonable person. The question before us is, how may the farmer best acquire a knowledge of these matters?

Just as in his business interests the agricultural paper should be placed as first in importance, so in his public interests the newspaper is the chief source of information and instruction. This statement is made with due regard to what is called the newspaper peril. The misuse of good newspapers is very common. The larger questions on the editorial page are entirely overlooked by many readers, while they seek out sensational material, scandals, and news of sport. This is one form of newspaper peril. Another form consists in the character of the paper itself. Papers with scare headlines, glaring colored prints of scandalous happenings, sensational news, stories with respect to the degradation of humanity—in other words, the yellow journals—are a serious form of peril to modern society. Fortunately in Canada we have little of the latter. Men must learn to choose and select, even from our good newspapers, those columns which foster intelligence and character, rather than those which appeal to the unhealthy craving for excitment. In spite of its perils, the newspaper is an indispensable means of education in modern society, and it is the farmer's duty to himself and to the public to make himself acquainted with the large national questions of the day, and this can best be done by reading a soberly-conducted high-class newspaper.

In addition to the newspaper, a magazine is good supplementary matter. It is unfortunate that so many of the magazines in circulation in Canada to-day are of American publication and of American spirit. There are, however, good Canadian magazines from which the intelligent man may make his choice.

In the question of reading for the home, the farmer's wife and daughters are not to be left out of account. The interests of the house are different from the interests of the farm, and if the farmer provides himself with a good agricultural paper that helps him in his work, it is only fair to say that those who do the work of the house should be equally well provided.

Reading for the children, whether in the farm home or the city home, is of importance second to none. It is in the period of childhood that, if ever, the habit of reading is formed, and the taste for good or for bad literature is formed at this age. It is the parent's business to see, therefore,

that the child acquires a correct habit of reading. Parents are often puzzled to know what they should allow their children to read. Through the medium of children's books ideas are gained which have to be set aside in maturer age. Fairy tales and stories of Santa Claus are the stock in trade of those who minister to the child mind, and the wisdom of giving to the children fancies from which they have to be disillusionized when older is sometimes questioned. The disillusionizing is a process in the development of character which is inevitable. The child mind is fed and nourished and developed to maturity in exactly the same way as the mind of the race has been nourished and developed to maturity. The first literature of mankind was poetry in form, and in matter, consisted of tales of wonder, myths, fairy stories, and anecdotes of miraculous doings, and heroic achievements. The imagination of the primitive mind was fed by this sort of material, while reason was of later development. We may take a lesson from this historical fact in ministering to the wants of the child mind. It is the imagination that requires first attention. There is natural to the child mind a sense of wonder, an aptitude for admiration of heroic acts. These things should be given in the reading furnished to children. Nursery rhymes, fairy tales to begin with, then books of travel and adventure. The speaker remembers with what delight he read in early boyhood the books of such writers as Kingston and Ballantyne. These writers are, perhaps, now replaced by Henty, Kipling, and Bullen, but the principle is the same.

In speaking of reading of this sort, we must not forget the dime novel peril. The dime novel is always cheap and nasty. Cheap in order that its nastiness may all the more readily be foisted upon the public. Its danger lies in its presentation of false and distorted views of life, holding up for the admiration of boys and girls mock heroism. This dime novel peril is a very real and a very grave one, and the peril of it can best be avoided by preoccupation. The craving for the unwholesome, cheap dime novel is not a natural one but a cultivated one. What is natural is a desire for witnessing brilliant and heroic action. If in the child's hands are placed books that satisfy this desire in a wholesome way there is little danger of the dime novel taking possession of his thoughts.

This last question is one which concerns not the farmer only, nor the farm home only, but every parent and every home in the land. If the youths of to-day are to grow up into intelligent men and women of the next generation, it is the parents' business to insure that, by safe-guarding the habit of reading. In this, as in all other respects, "the child is father of the man."

Mr. W. L. Smith: In discussing this subject I wish to speak chiefly of the value of agriculture bulletins. These hold an intermediate position between the agricultural paper and agricultural text books. The Department of Agriculture issues bulletins which deal with the topics of the day in a more correct way than agricultural papers possibly could. I think every farmer should make it a point to receive all the bulletins issued by the Department of Agriculture of Ontario. A friend of mine has made a point of getting all that are issued by the Departments at Ottawa and Toronto, and he has one of the most up-to-date farm libraries that I know of. You have no idea how much information can be obtained, of the greatest possible value, by simply filing away these bulletins in a proper way.

Mr. Walter J. Brown: I have been very much interested in listening to Prof. Reynolds on this exceedingly important question. I think his advice is along right lines, but it seems to me he omitted one important point in connection with the Agricultural department of the newspaper, and that is

the practical importance of market reports. The farmers in this country are excellent crop producers, but they are not business men in the sense that they ought to be, and they are not as familiar with the market reports as they should be. They are not reading them as carefully as they ought to read. and it seems to me that should be one of the first things and one of the most important things in the farm paper.

I was rather surprised to hear Prof. Reynolds say that the farmers' library should be practically for reference only. I do not believe in that. When I was on the farm, every agricultural book I could get I read from cover to cover, and I believe every farmer's boy who starts out in life with the right idea about agricultural education will read every agricultural book he gets. Many a time I have had interesting discussions with my father and with our neighbors with reference to the teaching of certain agricultural books, and many times have I heard agricultural books that were written fifty years ago quoted in these discussions.

Dime novel reading is a serious injury to this country, but there is another class of books which are almost as injurious, and they are the goody goody Sunday School books. Probably some people do not like this way of putting it, but the average Sunday School library is about as wishy-washy a thing as you will find in a day's travel. There are a few books in the average Sunday School library which appeal to the spirit of manhood or womanhood in boys or girls; or appeal to those things which are necessary to develop that manhood or womanhood.

Prof. Reynolds: I was thinking of the practice that was brought to my attention by reading a newspaper item which stated that a farmer thought he was doing good business by keeping the back files of the agricultural paper and stopping the paper. This was using the paper as a text book, and I think that is putting it in its wrong place. The information given in agricultural journals does not profess to be exactly scientific enough to take the place of the text book. We should not merely read the text book from cover to cover but we should keep it as a book of reference.

Prof. McCready: I am a school master, and it seems to me that a great deal of this valuable literature which is published through the Department of Agriculture is not finding its proper use; largely because the people are not properly instructed as to how to handle it. It has been our aim at the College to bring to the attention of the teachers the great amount of information that can be obtained from the bulletins issued by the Department of Agriculture. I think every school teacher in Ontario should know about these things and get the children interested in them. We have found the Department of Agriculture of the United States just as ready to send us their bulletins as is our own Department, and we have also found them very generous in answering any letters of inquiry sent by our teachers on any subject. A good deal of attention has been paid to building up libraries in schools, and they should have all the bulletins published by our Government, and these bulletins should be used by the teachers.

Mr. Holtermann: We frequently find in the country, and also in the cities, that only one newspaper is taken, and this gives you only one side of the political question. If we are worth anything as citizens we are only worth it to the extent that we are willing to sit down and weigh political matters judicially. To take a newspaper which only gives you one side of the question is to cater to a great extent to prejudice, and I would advocate that those who wish to hold sound and independent views on political matters should take two papers. If the agricultural class wants to make itself felt in public and political affairs it must study both sides of the question.

IMPROVEMENT OF PLANTS AND ANIMALS

By Prof. W. M. Hays, Washington, D.C.

It is with great pleasure that I bring you greetings from the United States Department of Agriculture. Modern facilities for the easy transportation of thought, and for travel, have resulted in the fullest reciprocity between nations, in science and in those products of science which are bound up in the economic potencies of new and improved forms of plants and animals. As the oncoming great work of plant and animal breeders produces more and more important varieties and breeds, these hereditary potencies will aid other forces, scientific, educational, political and religious, in binding together the peoples of the earth into one harmonious family. The educators, the scientists and the breeders interested in the agriculture and country life of North America do not recognize international boundaries in their interchange of ideas, nor in their exchange of valuable forms of plants and animals. Even in our most important show contests, international lines are almost ignored.

I wish also especially to bring greetings to this Agricultural Experimental Union from the American Breeders' Association. This is not a greeting from the United States alone, because that association is an international North American Association, with members also in countries of all continents. It was formed to promote the organization of research in plant and animal improvement and to bring about adequate organization to make over the plant and animal forms used by man. Every month of this organization, now in its third year, its mission seems larger and larger as well as clearer. A fair percentage of the one thousand members are Canadians, and I especially invite each and every member of this union to join. Your objects and those of that organization are so similar that I am sure you will pardon the statement here that the annual reports, containing papers and discussions by the brightest scientists and breeders, are alone well worth the money; besides, the membership fee of $1 per annum aids the work. May I also invite and urge that many individuals and also your societies of agriculture, horticulture, live stock, dairying, etc., take the twenty dollar life membership. The next meeting is at Columbus, Ohio, January 15-18, and a meeting should, at no distant day, be held in Canada. Your societies should send representatives to this association, which is rapidly growing into a strong and widely-recognized organization.

I wish to pay my compliments to your agricultural Experimental Union, and to those who organized and have guided its work. It is one of the very brightest stars in agricultural organization in the world. Here the State, the largest and most important of all co-operative agencies, co-operates with the individual. By delegating to the State those things which require centralization, and reserving to the individual those things best done by private effort, you here recognize one of the most profoundly important principles of social organization. Individualism in co-operation builds a stronger civilization, and makes a better average citizenship, than service in corporations. Agriculture is peculiarly adapted to the plan of delegating to co-operative organizations some of the general work, as the creative part of plant and animal breeding, the manufacture of dairy products, the selling of wheat and cotton, and the education of the farm youth, leaving to the family the business of producing the raw products of food and clothing. And the lessons secured both from failures and successes in co-operation in rural affairs, in this and other continents, give an exceedingly broad and

strong foundation for the hope that the application of this principle may save that most important world's organization, the combined unit we on both sides of the boundary so well know as the American farm home, from the modern tendency to centralize all industries in the hands of the few. The Experiment Station at Guelph has done much to preserve the farm home in Ontario. It might have distributed its valuable new varieties of crops through large and powerful seed firms, but your wise scientists and departmental administrators who also had the wisdom of statesmanship, sought to distribute them through you. The decision thus to organize you in this union has better distributed the profits from seed dissemination; has made a more complete distribution of the seeds; has kept the varieties up to better standards, and has added to the stature of the manhood of a large membership in this Union. Your plan and its results have been an inspiring lesson for every country, state, and province in the world.

For a century animal breeding occupied the center of the stage, but with the new century, plant breeding came into prominence. Mendel, deVries, Vilmorin, Burbank, Saunders, Zavitz, Webber and other pioneers having produced important results, which by profound physiological changes and by highly important economic betterments have forced upon the world the fact that our plant forces can be made more potent. A century of practical animal breeding under intense competition in show ring and sale barn had clearly brought out the fact that the individuality of a sire or dam is highly important. Animal breeders were slowly learning that supremely important fact that among these choicest individuals of a species, breed or variety, there is an occasional animal with very marked power to project his or her superior character permanently into the generation of his or her progeny, and that such individuals, or a small group of such individuals, may be used as the progenitors of an improved breed, or variety.

Plant breeders with a knowledge of the animal breeder's philosophy and with the opportunity, denied breeders of animals, of using very large numbers, soon began to broaden the philosophy of creative breeding. Some, with varieties best selected by mere art, and others, with varieties requiring the exact methods of recorded lineage and performance pedigrees, soon brought into the clear sunlight this most important law in creative breeding, that there is an occasional plant or animal, say one in thousands or one in ten thousands, the blood of which has the power to produce an improved breed, variety or family. DeVries and other scientists at about the same time, emphasized this law in practical breeding, by demonstrating that in nature there are mutations so powerful in lines of new heredity that from mutating individuals new varieties and even new species arise as if by magic.

Creative breeding is more and more being recognized as a systematic quest for the animal or plant with the transcendant breeding power the blood which may be multiplied as a valuable new form; as a scientific hunt for economic or artistic mutants.

Breeding is coming more and more to be divided into creative breeding—the business of multiplying pure-bred stock, seeds, and plants, and the use by practical growers of the pure-bred new forms. The highly trained specialist, whether he be a public official, an employe of a firm or co-operative association, or an amateur, must guide the creative breeding; though many new things of value in both plant and animal breeding will be found in practical breeding and in the growing of pure-bred and grade or hybrid stocks of plants and animals. On the other hand, the business of producing for sale pure-bred animals and pure-bred seeds and plants for sale to growers of animals and plant products, will develop in volume and in efficiency.

In both plants and animals much of the creative w rk may be done by the use of public funds under which the trained official can give assistance, method, permanency and accumulative assistance and efficiency to the co-operative association striving to breed for a specific purpose.

Importance of Plant Breeding. The Province of Ontario and the State of Minnesota each has, broadly speaking, 10,000,000 acres of crops which may be improved by modern methods of breeding not including most wild pastures and most forest crops. These breedable crops at ten dollars per acre are worth $100,000,000 annually. Ontario and Minnesota have led in point of time in developing state plant breeding establishments and in proving two facts of mighty import to these commonwealths and to the world. The first of these facts is that the world's staple crops can be so improved in their powers of heredity, that they will yield twenty five per cent. more value per acre. The second of these facts is that this remarkable increase can be accomplished at a cost of one-tenth of one per cent. of the increased value of the crop.

It is worthy of statement in this connection that these same two commonwealths have been prominent in working out systems of improved farm management, providing conditions of crop rotation, fertilization, cultivation and marketing under which the crops will yield nearly another twenty-five per cent. of increased value per acre. It should be recognized that though the improved conditions under which crops are grown must be provided each year at a cost of probably half the increased values, improvements in breeding once made are continuous. Both methods of increasing the net income per acre and per worker pay; but the method which deals with the fundamental heredity of our wild and our half-civilized plants is the more potent and marvelously the cheaper.

Applying these remarkable figures to either of these commonwealths we have the following for a forty-year period, twice the length of time the experiment stations at Guelph and St. Paul have already been at work on the preliminary parts of this problem.

Twenty-five per cent. of $100,000,000 annually is $25,000,000, and this multiplied by forty years gives $1,000,000,000 as the increased production for one of the commonwealths in forty years. One one-thousandth part of this is $25,000 annually, or $1,000,000 in forty years. The difference is $24,975,000 annually or $999,000,000 in forty years. Applying these same figures to 250,000,000 acres of breedable crops in the United States, we have an annual cost of $625,000 or for forty years of $25,000,000, annually producing increased crops valued at $625,000,000, or for the entire period valued at $25,000,000,000, at a cost so small that the practical statistician would call it a negligible quantity.

Since the size of these figures makes the footings on the ledger sheets of Intercontinental Railway companies look like pigmies, and are second in size only to the products of a commonwealth or a nation, they are foolish unless they can be justified. If they are based on sound evidence they represent an economic enterprise of more concern to legislative bodies than all their tariff and taxation schedules combined. If the proposition is one-hundredth part true; that is, if the cost of breeding should be ten times the estimated cost, and the increased yield of crops possible thus to produce only one-tenth that claimed: still the cost would be only one-tenth of the increased production. Even this increase in production at this relative cost in any great transportation or manufacturing enterprise would be seized upon by our great captains of transportation and industry with the utmost avidity.

Those of us who have seen the variable wildling or the cultivated species obediently change under our hands to forms with higher economic power; have sought in the literature of breeding and in Nature's book to learn how to lead plants to a life of higher utility; and have wrought to design methods of handling the plants and of organizing plant breeding, have now come to the point where we assert that this subject commands the attention of our leading statesmen and our most potent organizers of industrial enterprises. If even the most modest of the above figures be true, they are of wide import to the Hills, the Van Hornes, the C. M. Hays, the Morgans and the Harrimans, because they point the way to enlarged freights and increased prosperity on the lines of railways these gentlemen control; and they are sufficiently important as affairs of state to warrant prominent places in the messages to legislative bodies of our governors, premiers, and presidents.

Proof of Enormous Profits from Plant Breeding. Twenty years ago, and eighteen years ago, respectively, the Ontario and Minnesota Experiment Stations began the work of improving the field crops of these commonwealths. For more than a decade the workers in each of these institutions, working independently, devised their own methods. These methods were different in many respects, but in each case they were alike in that they attacked nearly the whole range of the staple field crops of the commonwealth. Only during more recent years have the experimenters had the benefit of the methods worked out by each other, and of similar efforts abroad and in other American commonwealths.

The Ontario station used improved methods of seed and plant selection with early and carefully planned distribution of the very best varieties to co-operators in the Ontario Experimental Union made up of ex-students of the Agricultural College here at Guelph, and of other enterprising farmers of the Province, from whom reports were received annually.

The Minnesota Station used the more technical methods of dealing with the individual plant and its breeding power, with distribution necessarily longer delayed, and by the sale of seeds at high prices to co-operators trained to be growers of pure-bred seeds. The time for a comparison of the two methods came some years ago and both stations, as well as many other similar stations, are combining the best of these two general methods, and of methods arising in other places, together with ever-recurring improvements, into systems of plant breeding and distribution which promise to be most efficient.

It must be understood that the methods used were at first not so efficient as those now in use, and that the results stated below would be still more striking had present methods been available from the beginning.

Proofs of Improvement in Ontario. The Ontario Agricultural College, as stated by Prof. C. A. Zavitz, has introduced into the variety tests on its experimental farm about 2,000 varieties of field crops. This testing has been followed by the persistent improvement by seed selection of those varieties proving best, and by the yearly distribution through the Experimental Union of the latest and best improved stocks. Table I shows how these improved stocks have compared under the condition of these experiment station tests with some of the leading standard varieties used in the Province. Here no factors entered to give differences in yields save the hereditary powers of the respective varieties. The experimenter's skill here, introduced, discerned, and improved those which through a long series of years proved to yield the largest value per acre.

These are the varieties multiplied by the College and widely distributed through the members of your Experimental Union to the farmers of the Province.

TABLE 1. COMPARATIVE RESULTS IN PLOTS AT ONTARIO AGRICULTURAL COLLEGE OF SOME NEW AND OLD VARIETIES.

Varieties.	Years Tested.	Per Acre Bushels.	Increase Per cent.
Siberian Oats	16	88.2	23
Black Tartarian	16	71.5	.....
Mandscheuri Barley	16	69.8	19
Mensury Barley	16	58.7	.....
Dawson Golden Chaff W. W	10	57.3	11
Early Red Clawson	10	51.6	.....
Empire State Potatoes	16	231.0	13
White Elephant	16	203.7	.....

Table 2 shows the yields per acre of Ontario's entire area of winter wheat, barley and oats for the first ten years of this work, before these varieties had been much improved, and for the second ten year period, just closed.

TABLE 2. AVERAGE YIELDS IN BUSHELS PER ACRE FOR ONTARIO.*

	10 Years 1887-1896.	10 Years 1897-1906.	Per cent of Increase.
Winter Wheat	19.2	21.7	13
Barley	24.8	30.6	24
Oats	32.2	33.3	19

It will be observed that, generally speaking, the improvements shown both on the experiment plots and on Ontario's entire acreage range between ten and twenty-five per cent. It is not claimed that all the increased yields are due to improvement in hereditary values of the varieties planted, because it must be recognized that crop rotation and a better knowledge of what systems of rotation are best, and better cultivation, have contributed to this result. On the other hand, it must be recognized that the new wheats, barleys, oats and potatoes have as yet carried their increased powers to only a part of the acreage. It must be further recognized that not only have the yields been materially increased, but that the oft-mentioned gradual decline in yields of twenty to fifteen years ago has been turned to a sharp increase in yields per acre.

In Table 3 are shown the acreages of the leading field crops of the Province, aggregating over 10,000,000 acres. It will be observed that winter wheat, barley and oats occupy about 4,000,000 acres. By applying to these the percentage figures in Table 1, on a valuation of ten dollars per acre, we have about twenty per cent of $40,000,000, or $8,000,000. Assuming that half of this is due to the improved varieties distributed, and the other half to better farming, we have $4,000,000 per annum, or $40,000,000 for the ten year period just passed. Improved varieties of spring

*According to Reports of Bureau of Industries.

wheat, peas, potatoes and of other kinds of crops have also been disseminated, which would considerably swell this sum. The cost during the ten-year period, of all the work on all kinds of crops which may properly be charged to the improvement of field crops has been under forty thousand dollars. The expense is clearly within the one-tenth of one per cent of the improvements perfected. Other lines of proof might be deduced from Prof. Zavitz's brilliant work in Ontario, and similar proofs can be found in the work of Dr. Saunders at Ottawa.

Table 3. Area of Farm Crops in Ontario, 1906.

Crops.	Acres.	Crops.	Acres.
Winter Wheat	787,287	Corn for Husking	289,456
Barley	756,163	Corn for Silo	180,796
Oats	2,716,711	Potatoes	136,064
Spring Wheat	171,745	Mangels	69,353
Peas	410,356	Carrots	4,980
Rye	79,870	Turnips	132,512
Beans	51,272	Hay and Clover	3,069,917
Buckwheat	106,444	Pasture	3,349,101

Proofs of Improvement in Minnesota. The Minnesota Experiment Station likewise has introduced, or bred, and tested varieties of field crops numbering into the thousands. There, instead of an early careful selection, as by taking the best seeds from the best heads, the standard and introduced varieties proving best were usually first passed through the severe discipline of the plant breeding nursery. The stocks which proved superior there were afterwards placed in the variety tests and those there gaining the ascendency were distributed.

This longer process necessitated a greater delay of distribution than did the Ontario plan. The Minnesota proofs, therefore, cover shorter periods than the Ontario proofs, and afford a different form of the proof of the profits arising from plant breeding.

Minnesota No. 13 corn secured and subjected to nursery breeding in the early nineties has been distributed for a decade along the northern zone of the corn belt in Minnesota and adjacent states. It has been one of the leading factors in pushing the dent corn belt to the northward in these states, and has been the leading dent variety used for thick planting in the production of short-growing, fine-stalked fodder corn and ensilage for the north zone of the dairy belt. Its value is represented by figures expressed in millions of dollars.

Minnesota No. 163 wheat, and Minnesota No. 169 wheat, bred by nursery selection from the common Fife and Blue Stem spring wheats, which were supreme in Minnesota till seven years ago, yielded four and six bushels respectively more than their parent varieties on the University farm during their regular field tests trials, and 15 to 18 per cent. more, respectively, than the wheats of the state on the farms of the several hundred pure-bred seed growers to whom they were first sold. These wheats are estimated as already covering upwards of two millions of acres and adding an average of two dollars per acre to this crop. It seems conservative to estimate that this will continue for five years before they are overtaken by better varieties which are springing from the Minnesota station and from other breeding centres. This represents the sum of $20,000,000 of increased production. All the expenditure to date on breeding wheat is well within $20,000.

Primost flax, produced under systematic nursery plans, yielded 21 per cent. more in the field test trials at the experiment station, and when forty-eight growers of pure-bred seed, to whom it was sold, tested it beside the common flax grown for seed, it yielded 15.0 as compared with 11.9 for the common flax, or a gain of 25 p.c., worth three dollars per acre. If, as seems a fair assumption, this variety of flax before it is overtaken by still better varieties promised from the Minnesota and Dakota Experiment Stations, covers one-half Minnesota's acreage, or 200,000 acres, for five years, or a total of 1,000,000 acres, with an increased value of $3 per acre, its added hereditary power will have produced $3,000,000. The production of this variety cost the State of Minnesota and the United States Department of Agriculture, which are co-operating in this work, less than $3,000.

Still other lines of proof might be deduced from the work of these two stations and the work of the two governments and of numerous states and provinces, also the achievements of private breeders might be drawn upon for probably even more convincing facts as to the profits arising from scientific breeding.

The prominent fact that stands out for the new century to deal with is, that this work pays fabulously. In my native state, Iowa, we say that the soil is a streak of pay dirt that turns out a crop averaging a million dollars for every day in the year; and will turn over and repeat the $365,000,000 trick every year. The highly developed state breeding establishment of the future will easily turn pennies into dollars and even into eagles. Nature admonishes us to harness fire and electricity and heredity, all too long allowed to run wild.

Perfecting Plans for Plant Breeding. The Experiment Stations and Departments of Agriculture which see clearly this rising proof of the immense profit to all the people from the expenditure of public money, should be economists enough to rapidly broaden out their plans to meet the situation in its largeness. When legislative bodies see clearly what those most experienced in plant breeding under public expenditure now see, they will be ready and eager to finance this work. They will only ask if plans are developed, if sufficient workers are available and as to the amount of money required which can be economically used.

Heretofore the pioneers have each worked too much alone. While this has resulted in originality of method, necessity being here the mother of many inventions, the time has come for more conference, more references of written plans for the criticism of other workers along similar lines, and more team work in devising specific, practical plans for each experiment station, each worker, each species; and for each local and each theoretical problem. The problem of creative breeding in plants and in animals is made up of long-time propositions. These projects require that the man and the materials in the form of varieties or breeds, be together for a long series of years. The work must be so organized that the successful workers will have long tenures of office. This work requires broader synthesis of unit characters than is required of the synthetic chemist. There are greater artistic opportunities here than in sculpture and painting combined, because the breeder fashions his artistic products not only as to form and color, but as to action, fragrance, flavor, food value and as to a thousand and one characters of texture and other qualities giving peculiar value and artistic forms to raw and manufactured products. The primary colors which the painter fashions into an infinite variety of imitations, are but one group of the units which breeders command in producing artistic and economic

realities. The breeder combines science and art in directing the teeming impulses of organic nature to make her forms more various and more valuable to man.

In case of every group of varieties there is need of plans along certain lines which may already be fairly well defined, and these plans gain definiteness if placed on paper and are there built up under the critical analyses of several minds working along the specific line in hand or along related and more general lines. In case of breeding each group of varieties for each specific condition of locality, production, or use, the object to be sought, the lines along which desired changes are to be made, should be closely defined. The methods of procedure, also, should be wrought out step by step, as experience adds knowledge wherever and by whomsoever gained. These statements of purpose and plan should be revised; changing plans, however, only when other considerations outweigh the advantages of continuity along the previously prescribed lines. Thus, there is need of definite plans as in each state breeding spring wheat, in each state or valley needing better winter wheat, in each region needing hardier red clover, in each agricultural area needing better pasture timothy, in each area with soil and climate peculiarly favorable to peaches, in each group of counties requiring a special kind of corn, and in each class of greenhouses devoted to the culture of a given flower or vegetable.

The American Breeders' Association has appointed on its more than forty committees over two hundred men who are beginning the work of encouraging the production of such plans by each breeder as will suit his needs. These committees cover animal breeding as well as plant breeding, and it seems not too much to hope that their reports during the next several years will mark efficient organization in breeding in the North American continent. Not only must each species be dealt with, but the broader administrative questions of organization, and especially of seed and plant introduction, must be wrought out. For example, the Ontario plan of distributing selected field seeds through this Agricultural Experimental Union, and the Minnesota plan of distribution through growers of pure-bred seeds, nursery-bred seeds, will ere long be capable of comparison as to their relative efficiency. One plan may prove superior to the other; or, what is more probable, a combination of the best elements of the two plans may best serve in building up the yields per acre and per worker of these and other great commonwealths. Let there be friendly rivalry in comparing the efficiency of these plans, and especially in seeing who can work out of the two plans the best plan for the future.

Evolution of Animal Breeding. The change in plant breeding from very little and poorly organized work to a mighty movement at once scientific, artistic and economic, is quite revolutionary. The development of animal breeding, on the other hand, from the fairly satisfactory methods of the past century are only evolutionary. The suddenly increased interest in plant breeding, the discoveries of Mendel, de Vries and other plant scientists, the development of scientific and artistic methods of practical plant breeders, and the widely recognized results of plant breeding, have been among the prime causes of renewed activities in animal breeding. However, no one should underestimate the potency in the movement started decades ago by Wallace to apply performance records to trotting horse pedigrees. The advanced registries of dairy cattle and the systematic use of performance pedigrees in dairy breeding are showing breeders of other classes of animals that breeding powers of parent animals and of fluxes of blood, are measured only by the average values of the progeny and that

scientific records of performance are the chief value of lineage pedigrees. The work done in Ontario under the Hon. John Dryden in organizing the breeding of bacon hogs is one of the first and tallest milestones in public organization of animal breeding.

Animal breeders are coming to see that the milking Shorthorns, the Vermont Morgan horses, and other most important foundation stocks have been neglected and almost lost, while statistical records of the performance of animals both as to their individuality and as to their breeding power, would have resulted not merely in the preservation of these valuable types, but in their development into breeds of the higher value. Canada has been no less at fault that the States in too narrowly adhering to mere outward appearance of the rare animal in most of the meat-producing breeds, giving relatively too little attention to the more vital facts as to the average value of the individuals of the family of animals in strong fecundity, in resistance of disease, in feeding power and in general ability to yield money per herd on the practical farm.

The new movement in breeding is bringing to animal breeding many new philosophies and new problems of business practice. The opportunity to use large numbers in plant breeding has resulted in showing that the farm herd of pure-bred stock, generally to be dispersed on the death of the owner, is entirely too small a unit for efficient work in the creation of those new animal values which modern breeding results have shown to be possible. Animal breeding must be organized on a broader basis or it cannot keep up with the creative work already assured in plant breeding.

The American Breeders' Association in seeking to bring about wide co-operation in the consideration of the improvement of our domesticated and wild animals, has appointed a number of committees. While the interests in game animals and birds, in fur animals, in fishes and in pet stock are being considered, the large questions concern the great meat, milk, wool, egg and work-producing animals. Two billion dollars worth of annual production along these lines in North America during the next forty years will increase without material improvements by breeding so as to average more than three billions annually. Under material improvements in breeding effected in part by the expenditure of public money, this can surely be increased ten per cent. This would amount to $300,000,000 per annum. The sum of $12,000,000,000 for forty years is a very large possible goal. The public cost of all work practicable to do in animal improvement towards affecting the result, could hardly amount to one per cent. of this sum. Since the world is no longer satisfied to deal with its largest questions in a local or in a provincial way, those interested in problems of breeding animals will be excusable if they look to even larger units than our herd book associations and the individual breeder in their efforts at creating new values in their horses, cattle, sheep and hogs.

One plan for effectively improving the breeds of animals under consideration comprehends the utilization of large numbers of long-continued efforts with a given stock of animals, of scientific methods in securing records of individual excellence and of breeding power, and of more effective means of highly accrediting to growers those fluxes of blood which have the highest merit when submitted to the crucial test of highest production of profits on the practical farm.

This discussion has been centered around what may be termed a plan for *co-operative circuit breeding*. This plan contemplates public and private co-operation. It provides for the use of public funds to provide scientific

direction, for expert testing, and for the keeping of lineage and performance records, and to insure long-continued efforts along well-defined lines, to record highly authenticated proof of excellence of many superior animals to be sold to the public, and for the gradual accumulation of scientific knowledge of breeding and of practical plans for bettering our live stock. The plan contemplates that the individual co-operative circuit breeder shall purchase, produce under public supervision, and sell to those whose business it is to produce pure-bred animals for growers, superior males and females, with which to improve their pure-bred herds so that they in turn may supply to growers animals of higher average excellence, that our general live stock may be more highly and more truly up-graded.

The machinery suggested is that there be organized about each of numerous centres, as experiment stations, a co-operative association of twenty or more farmers such as is now being organized in the vicinity of the Minnesota Station to breed milking Shorthorns; that each member agrees to purchase at least the minimum number required of females and one male of approved quality; and to care for and breed them according to the prescribed plan; and that the co-operative association act with two public officials, the three serving as a managing board. The plan contemplates that this managing board, or Circuit Council, shall appoint a circuit superintendent through whom the public money shall be spent, and who will aid the individual co-operation in securing their foundation animals; in devising good and uniform methods of caring for, breeding and testing the animals, and who will supervise the making of all records.

The distribution of the valuable resultant stocks of animals under private ownership seems well provided for, by dividing the animals into three classes, the first and best of which shall be sold under open competition within the association; the second class, which may be sold as pure-bred stock to outside breeders, and a disqualified class which cannot be registered. This plan retains not only to the individual circuit breeder an independent business, but builds up rather than jeopardizes the private business of the regular outside breeder of pure-bred stock,—as some plans for public aid to animal breeding might do. It preserves individualism under co-operation.

Breeding Wheat.

The following is in very abbreviated form, the supplemental oral statement made in connection with illustrations, stereopticon views and moving pictures showing the actual operations of breeding field crops at the Minnesota Experiment Station:

Wheat will serve as the crop to illustrate the rather formal and scientific methods of breeding in use at the Minnesota Station. During the years 1888 to 1892, the temperate climates of the world were ransacked for better varieties of spring wheat than were already in use in the state. When it began to appear that Fife and Bluestem wheat, almost universally used in the state, were probably better than any of the newly acquired kinds, the problem was changed from depending wholly on new sorts, to making from the old varieties new kinds of greater value. Three kinds of effort were soon started to improve the old wheats: (1) by scientific selection; (2) to first mix the blood of two or more varieties and then apply selection to these more variable stocks; and (3) to make researches on how to breed wheat and other field crops.

The following outline gives the general plan for breeding wheat by selection. Each of the several best varieties are used for foundation stocks. The breeder goes into a field of a given variety and selects two pecks of the largest, strongest best filled spikes of wheat from a given variety. These are shelled out head by head and several superior seeds are taken from each of the heads containing good wheat of good quality, thus securing ten thousand seeds. Or, if the start is made in the spring, the breeder selects the ten thousand seeds from the bin of bulk wheat.

A plot of uniform land suited to growing wheat is prepared so as to have a finely pulverized seed bed. With a nursery planting machine devised for that purpose these seeds are planted in hills four inches apart, one seed in a hill. Two men operate the machine, one dropping the seeds in each of fourteen cups, which when thrown over deposit the seeds in fourteen tubes four inches apart, and extending two inches into the soil. The other operator by means of a lever throws the machine forward four inches, thus checkrow-planting the individual seeds. The weeds are kept from growing in these plots in which the plants stool out and grow about as thick as in a wheat field as ordinarily planted in field practice.

When the grain in this foundation bed, as it is called, is ripe, a careful man with grass hook or sheep shears clips off and removes all plants which are not among the strongest. Using care in the later selection the best five hundred are left standing. The several heads from the several culms from each of these individual plants are now harvested and placed in a large envelope. Envelope of one stock of paper only are used, so as to be all of one weight, and the envelopes and contained heads of wheat are weighed, that those weighing lightest may be thrown out, thus to avoid further expense. The two or three hundred remaining are now shelled and the neat grain is weighed and is also graded by inspection for market and milling quality. About one hundred of the plants yielding heaviest of superior grain are now chosen out of the lot for mother plants, and the respective stocks of seeds are given the honor of nursery names called nursery Stock Numbers, as "N. S. No. 1-07." "N. S. No. 2-07," etc., the '07 showing the year in which they were first entered in nursery plots. The second year the seeds from each of these mother plants are placed in centgener plat test. This word "centgener"—from "centum" and "genera," meaning one hundred of a generation—grew out of the need of a name for the one plat tests in which one hundred plants from each of numerous mother plants were grown to compare the breeding powers or variety producing efficiency of the blood of respective mother plants. When these plants are ripe the number actually reaching maturity in each centgener plat is determined by counting; the whole is harvested, threshed, and the weight of the neat grain is determined. The weight of the average plant is then determined by dividing the total weight by the number of plants harvested. The grade of the grain is determined by inspection, and the yield per plant and the quality of the seeds from the respective mother plants are then compared, and those making the poorest record are discarded, thus to avoid further expense on the unpromising nursery stocks. The remaining stocks are again placed in nursery plats the third and fourth years, and the half dozen averaging best in the three annual centgener plat tests are given the honor of being selected for trial in field plat tests.

When a variety goes from the field trial plat it is given a variety number, as "Minnesota No. 163," wheat and "Minnesota No. 169," wheat. Usually the seeds from the nursery plats are not sufficient in quantity for tenth or even for twentieth acre field test plats, and they must be grown

for a year in increase plats, so as to secure sufficient seeds for the larger plats. Here for three successive seasons the newly originated varieties are planted and carefully handled with the ordinary drills and reapers, and with a special threshing machine. Here they are grown beside their parent variety and other good varieties. If one or more shows especial promise of large yield and superior quality of grain, it is increased for milling and baking tests, and other nearby experiment stations are asked to place it in their variety tests. A variety which comes forward victor in these tests is honored with a name—as the new flax, called "Minn. No. 25," when in the field plat tests, but when distributed to the farmers was named "Promost"—and is increased to one or more thousands of bushels, and is given the crucial test of commercial use by the farmers and the millers of the state. It is of interest to note that varieties which have successfully run the gauntlet of the experiment station tests have all made good among the farmers, grain merchants and millers. The work of breeding by selection does not stop with experiments started in one season. In successive years new foundation beds were started from original or improved stocks, and new varieties are a regular product, though, under this rigid scheme of selection only a very few of the supremely best varieties are distributed. These are kept clean of admixture and further improved by the simpler methods of selecting superior heads from strong, typical plants, both at the experiment station and on the farms of the growers of pure-bred seeds throughout the state.

The second method of wheat breeding followed is by hybridizing to secure new foundation stocks from among which to select mother plants. As will be seen in the above statement, the effort is to secure that rare mother plant which has the power to project into her progeny the heredity to yield more value per acre. The value of the future variety chosen depends upon the heredity of a single kernel of wheat. Selection consists in singling out the blood of that kernel. By crossing two varieties we hope to produce an occasional kernel of wheat the blood of which will have more value than that contained in any kernel in either parent variety. Hybridizing then, in wheat, which is self pollinated, is concerned with the attempt to produce an occasional kernel with blood of higher value than any in the parent variety, that it may be found and multiplied into a more useful variety of wheat. In other words, the hybridizing method consists in crossing numerous flowers from two varieties, increasing the resulting hybrid stocks for three or four years, and selecting from the best heads ten thousand superior seeds to plant in the foundation beds from which to secure one hundred or more mother plants, the nursery stocks from each of these to be run through nursery and field test trials as in breeding by selection alone mentioned above, that the one best blood line may be secured.

The distribution of new varieties is second in importance only to finding and creating them. The Minnesota station's method of breeding results in finding occasional varieties with at once marked improvement, thus differing from methods which earlier produce results less pronounced. Under this method of breeding, it has been found practical to establish high prices, double or treble elevator grain prices, and to offer new stocks to men who care to become growers of pure-bred seeds. The increased price of these seeds, highly accredited by the publications and the tabulated yields given out by the experiment station, creates a business, and puts a commercial movement behind the rapid and wide dissemination of these new seeds.

Hon. Mr. Dryden: Prof. Hays has been talking to us in figures, of the benefits that will accrue to us from this kind of work, and, in taking notes while he was speaking, I put these words down, "unthinkable figures." Did he not say something about $999,000,000? You young men can understand that, but I cannot take it in. I cannot get hold of it. They are really unthinkable figures to me. What I want to say is this, that notwithstanding the impression it makes upon me, the principle he has enunciated is absolutely sound. In one of the last speeches I made in the Legislature I was talking about the benefits which had accrued from this and other organizations in connection with this College, and I have frequently said that I would just as soon undertake to produce 80 bushels of barley per acre on my farm to-day as years ago I would undertake to produce 60 bushels with the old kinds of grain we grew. I know it can be done, simply because I have got a better variety of barley, and when I increase my products in that way, and my neighbor increases his, we soon get to these great "unthinkable figures." No wonder that the railways say their traffic is increasing, and they do not know what is increasing it. Very likely they have not studied it out; but there it is. They have to get more cars in order to carry the products out of the country, and we have heard over and over again during recent years, of the enormous increase in the deposits in the banks. What has brought this about? I tell you this very organization here—this organization that had such a small beginning has done perhaps more than any other single organization in bringing it about—scattering these new varieties, these great yielding varieties all over this country. Mr. Hays never made a statement that was stronger or truer than the one he made here just now when he said, it pays fabulously. The politicians do not understand it, the vast majority of the people are not thinking anything about it, but all the same the work is quietly going on; and I want all you young men to stand by these organizations which have for their object, not only the increasing of the fertility of our soil, but also the production of better varieties which will enable us to increase our yields. I had the privilege of meeting Prof. Hays at the World's Fair, and also several other men who, like him, were interested in this line of work, and I was surprised when they told me that the principles underlying this plant breeding were precisely the same as the principles underlying the breeding of live stock. I have never forgotten it, and I have been more interested in this work ever since than I ever was before. You cannot do better than give this work every kind of encouragement. I am very glad to have heard Mr. Hays again, and I have been very interested in all he has said, and in these figures which he has given. (Applause.)

PLANT BREEDING.

By Prof. L. S. Klinck, Ste. Ame de Bellevue, Que.

We in Canada count ourselves fortunate, especially from the scientific standpoint, in that our neighbors to the South of us have such vast areas where the soil, the climate, and the natural conditions generally closely approximate those of our own country. Similar conditions have produced similar problems and in our attempts to solve them we may be mutually helpful. We count ourselves fortunate also in that the results of these investigations are published in our own language; but to-day we count ourselves especially fortunate in having with us the man who for almost two

decades has been in the forefront of agricultural progress and research, and to whose untiring efforts in large measure is due the successful organization and work of the American Breeders' Association, an association broadly international in its scope and activities.

In Professor Hays, we have a man of prophetic vision, a man, who more than a decade ago was able to discern not only the signs of the times, but with larger vision foresaw the need for systematic long-period effort in improving the plants and animals of a continent. It is not possible to estimate at its true worth the value of his work without spending a few weeks at St. Anthony Park, Minnesota, where in wheats, Minn. No. 163, and Minn. No. 169; in barleys, Minn. No. 105, in oats, Minn. No. 26, and corn, Minn. No. 13, to mention but a few of the improved strains and varieties originated, and subsequently grown on tens of thousands of acres throughout Minnesota and adjoining states, testimony is borne to the fact that in some degree, at least, the vision of this pioneer in crop improvement has been realised.

The younger men just entering upon the field of plant improvement have, and rightly should have, small desire to speak when personally they have done so little; but I trust we have caught some of the enthusiasm of the forerunners in this movement, and having profited by their experience, hope to contribute our share to the great work of plant and animal improvement.

A decided advance was made, looking toward animal and plant improvement, when the American Breeders' Association was organized, an organization including both plant and animal breeders. An association of far-reaching influence in this country is the Canadian Seed Growers' Association. It is well that in the International Association, plant and animal breeders have been brought together. There is much each can learn from the other. Until recent years the improvement of plants had not been rapid. Even now, because of the presence of certain problems, not yet solved, progress is not as rapid as the demands warrant. The breeders of plants, building upon the foundation principles laid down by the breeders of animals, for many years followed their methods. But the plant breeders have certain advantages over the animal breeders, and the last decade has witnessed a pushing forward into new fields and the adoption of plans and methods suited to the needs of the work.

The animal breeder must necessarily confine his attention to comparatively few animals, because of their size, the cost of production, the value of the individual and the time required for them to reach maturity. Plants, on the other hand, are small in size, occupy but little space, require but little capital and mature in a few months, giving a splendid opportunity for the breeder to make a careful study of the product of each individual during the winter months. As a result, the breeder of plants can handle thousands when the breeder of animals can handle tens. With the latter the loss of a few individuals is not a matter of serious concern unless they be individuals of outstanding excellence. By means of chemical analyses, the gluten test, the baker's sponge test, or better still a complete milling and baking test, he can determine the relative economic value of the different strains of his improved wheats. In the case of oats or corn a close study of the physical characteristics will give a comparatively accurate idea of the relative value of the different strains. By using a part of the product of a number of individuals to determine the quality of the strain the work of further improvement need not be seriously interfered with, or progress retarded.

While the animal breeder generally confines his attention to creating valuable strains within a given breed, and rarely to the originating of a new breed, the plant breeder more frequently aims at creating a new variety with distinct taxonomic differences. While the differences have often been forthcoming, too often varieties have been produced which have added nothing of value to the already overburdened list we now possess. A new variety or strain which fails to embody some advance in some desirable character or characters over what we already possess is not only of no economic value, but, if placed on the market, is a decided detriment to the cause of improvement. Improvement within many of our standard varieties is possible and so long as marked variations exist judicious selection within the variety will not be barren of results.

We are constantly making progress in the direction of simplifying the mechanics of plant breeding. Any improvement in this direction which enables a breeder to accomplish more and better work in a given time is a direct contribution to the science of breeding because it makes possible the successful handing of a much larger number of plants. The creation of a literature of breeding will prove of inestimable value to the farmer, the student and the scientist, while co-operation of the National and Provincial Stations with Breeder's Associations, with individual breeders and with commercial organizations for the collecting and disseminating of information bearing on breeding problems will give an added impetus to the work.

As has been pointed out, progress is being made, but less rapidly than the importance of the work demands. Private enterprise has proven inadequate to a work demanding years of painstaking systematic effort. Until such time as the originator of new and valuable strains can reasonably hope to reap some pecuniary remuneration commensurate with the value of the public service rendered, private initiative will prove inadequate. The proposition is one fraught with such great possibilities that the work demands, and in many Experiment Stations is receiving some measure of Provincial State or National aid. These long-time propositions demand not only trained men but men with long tenure of office. Spasmodic attempts without a clear-cut definite aim are sure to end in disappointment and needless expenditure of time and funds. The results obtained by Burbank and Bailey in so many fields of plant improvement by Hays, in cereal, forage, and fibre crops, by Saunders in wheats and fruits, by Zavitz, in many of the small grains, by Hopkins in corn, by Hansen in hardy fruits, to mention but a few of the foremost breeders in the American plant world to-day are the direct result of Government aid, coupled with long-period tenure of office on the part of the breeders themselves.

Colleges, Experiment stations and sub-stations, when made the centres of plant breeding activities, touch large numbers of students, and in Ontario, thousands of active co-operators in plant and animal improvement. These experimenters, in turn, should become centres for the dissemination of information obtained not only from the experiment stations and from meetings of this kind, but what will usually prove more helpful from the work done by the members on their own farms.

We have been told this afternoon that in extending the natural bounds for the successful culture of crops the plant breeder is to-day literally creating a new earth. But the gulf between the successful breeder and the majority of farmers is very great. Fortunately this gulf is not fixed. Community of interests is producing co-operation in effort.

Importing and testing of promising varieties, hybridizing to produce necessary variations, and selection to fix desirable characters; the produc-

tion of strains adapted to different climates, altitudes and soils, the production of varieties resistent to the ravages of diseases and insects, methods of starting foundation stocks, methods of selection, studies in the pedigreeing and distributing of strains of proven merit will long remain almost solely the province of the station breeder. Advanced farmers, in ever increasing numbers, will continue the selection of good plants with good heads and good grain. The average farmer will continue the judicious use of the fanning mill. The class below the average—and every Province, county and township has them, which makes no selection at all, is gradually becoming smaller and smaller, and, fortunately, in some sections is now almost an unknown quantity. When each class shall have moved one notch forward looking towards increased performance and efficiency, who can estimate the result.

LEGISLATIVE CONTROL OF FEEDING-STUFFS.

By W. P. Gamble, O. A. C., Guelph.

Attention has repeatedly been called to the desirability of some official system of inspection and analysis of concentrated feeding stuffs as sold in the Dominion of Canada and which will further necessitate the manufacturer or vendor of these products to attach to each package or parcel a tag bearing a guarantee of the percentages of protein and fat contained in the feed, or, if sold in bulk, to produce on demand a guarantee of the percentages of the two constituents mentioned. Such a plan has long been in force with regard to the essential constituents of plant food in commercial fertilizers, and the ever-increasing number of milling by-products now offered for sale renders it equally important that a similar plan be adopted for them. This matter was discussed at some length by this Union upon three former occasions, and is here again brought forward because recent analyses ordered by the Dominion Government have furnished an excellent illustration of the force of this contention.

In the early part of 1905, recommendations read at the last annual meeting of this Association were forwarded to the Government. These recommendations have been acted upon in full and the information is now to hand in Bulletin No. 116, Laboratory of the Inland Revenue Department, Ottawa.

It is not necessary to enter into any detailed discussion of these results in order to make good the point under consideration. A casual review of them, with reference to the percentages of protein and fat, will suffice to assure those informed on the subject that in most instances the feeding values and prices of these feeds are not in accord. In fact, at the present time feed is retailed at so much per ton whether it is rich in protein and well suited to supplement our ordinary farm feeds, or whether it is a starchy feed, and, therefore, of much less value in compounding suitable rations for cattle. Such being the case, special care in the purchase of feeds and some knowledge of their chemical composition will be found of great value in selecting the feeds that will produce the greatest profit. Economical purchase, however, does not imply the purchase of the lowest priced feeds. Many of the waste products of our mills are not altogether worthless, but it is important that the purchasers should know what they are and what relation they bear to standard feeds such as bran, shorts, etc.

In view of these facts, and in view of the further fact that the committee appointed to deal with this does not deem it practicable to establish limits of variation, I beg to offer the following resolution:

"Whereas on three previous occasions the subject of commercial feeding stuffs has been before this Association, and two separate petitions have been presented to the Government asking that some means be devised whereby the purchasers of mill by-products might be able to judge of their nutritive value; and whereas the Government has complied with these requests in so far as to order a collection and analysis of most of the by-products of the mill; and whereas the analyses show that the composition of wheat bran, shorts, or whole grains, or meal obtained by grinding any single grain, is fairly constant, but that the composition of other commercial feeds varies widely; and whereas bran and shorts constitute the sole output in the way of by-products of many small mill owners throughout the country, and there being no purpose to be served in requiring these men either to employ a chemist or to have analyses made of these by-products of constant composition; and whereas the adulteration of these by-products is fully covered by the Adulteration Foods Act, R.S.O., Chapters 24 and 25; and whereas the committee do not deem it practicable to establish standards or limits of variation for by-products, therefore be it resolved: (1) That the terms 'bran,' 'shorts,' or 'middlings,' when used without further description, shall be construed to mean by-products derived solely from wheat in the ordinary processes of milling, and the products so described shall be free from oat hulls, barley hulls, buckwheat hulls, ground weed seeds, or other substances not derived directly from wheat in the process of milling, and that feeding stuffs containing products not derived from wheat in the process of milling and sold under the name of 'bran,' 'shorts,' or 'middlings,' without further qualification or description, shall be regarded as adulterated feeds; (2) that other milling by-products which are not derived from wheat, but which may be properly described as 'bran,' 'shorts,' or 'middlings' shall not be offered for sale without prefixing the name of the grain from which they were derived to the terms 'bran,' 'shorts,' or 'middlings,' such as, for example corn bran, pea bran, buckwheat bran, buckwheat shorts, buckwheat middlings, etc.; (3) that it is not advisable to require any formula for the composition of wheat bran, shorts, the whole grains, or meal obtained by grinding any single grain; (4) that in the case of other feeding stuffs, each manufacturer or vendor should be required to label each bag or package with the percentage of protein and fat, or, if sold in bulk, that the manufacturer or vendor shall be compelled, on demand, to give a written guarantee of the percentage of protein and fat; and further, if the product offered for sale as a concentrated feeding stuff is a mixture, containing weed seeds, milling by-products, or any by-product derived from the manufacture of starch, cereal foods, split peas, or other manufactured products, the manufacturer or vendor shall be required to furnish a statement showing the kinds of by-products contained in the mixture, and the percentage, by weight, of each by-product in the mixture; (5) that the Government be urged in the interests of feeders of live stock to take such action as indicated in (4); (6) that a copy of this resolution be submitted at Farmers' Institute meetings for the signatures of members, and when these signatures are secured this resolution be construed, as a petition to the Government for the action outlined in No. (4); (7) that a copy of this resolution be forwarded to the Minister of Inland Revenue forthwith, and that the signatures be forwarded as soon as obtained."

After some discussion this resolution was duly moved and seconded, and was carried unanimously by the meeting.

RESOLUTION BROUGHT FORWARD BY MR. W. J. BROWN.

As we have no Alumni Association, it is sometimes necessary to use the Experimental Union for that purpose. We have now quite a large number of college and university graduates who have been admitted to the degree of Bachelor of the Science of Agriculture. A few years ago Dr. Mills asked me to look into the matter of a gown and hood for those of our number who had secured the B. S. A. degree. This I did, and I understand that not long ago the University Senate approved of the recommendation. Anyone holding a B. S. A. degree from the University of Toronto is now entitled to wear the regular "B. A. cap and gown," with a cardinal hood trimmed with white fur. As graduates in Agricultural Science we are looking forward to the degree of Ph. D. It is proposed, however, as an intermediate step to formulate some plan so that graduates of at least three years' standing may be able to take the degree of Master of the Science of Agriculture. This will apply to those who already have the degree. As to the future, our object is, of course, to stimulate graduates to continue their studies. I therefore move the following:

"With a view of encouraging post-graduate and research work in Agricultural Science, and to recognizing work already done, be it resolved that a committee of three graduates of the University of Toronto holding the degree in Agricultural Science be named by the Chair to confer with the Agricultural representatives of the University Senate regarding the drafting of regulations, etc., under which a Master's degree in Agriculture may be granted to graduates for research work and otherwise to those of not less than three years' standing."

This resolution was seconded by Prof. H. L. Hutt and carried by the meeting, and the chairman appointed a committee consisting of Messrs. E. C. Drury, W. J. Brown, and Prof. G. E. Day, to take charge of the matter.

PROGRESS OF THE O. A. C. DURING 1906.

By President G. C. Creelman, President O. A. C., Guelph.

It would not be right that an event of this kind should pass over without something being said of the changes which have taken place during the past year, to show you how the institution has grown, and how, without any desire on the part of anybody to make a change, by simple methods of promotion and tempting offers from other places, the staff of an institution of this kind is depleted during the year.

I must first refer to one who came to us for a short time, Prof. Franklin Sherman. He came to us from North Carolina, and remained nine months as Professor of Entomology and Zoology, but was called back to his old home at an increase of $700. In losing Prof. Sherman we gained the Rev. Dr. Bethune, and his kindly face and disposition has already made for him in the hearts of the students and faculty an enduring place. We thought last year we had lost Prof. Lochhead, but he came back to us for a short time, and has now gone finally to his new work at St. Anne's. At this time it was thought best to divide the Department of Biology into two branches. Dr. Bethune has charge of Entomology and Zoology, and Mr. S. B. McCready is Professor of Botany. Mr. Thompstone and Mr. Jackson, Demonstrators in Botany, left us to go to very lucrative positions, each of them worth $2,000 a year, one in New Zealand, and the other in far off

India. We are fortunate in securing for their places Mr. J. W. Eastham, of the University of Edinboro', and Mr. J. E. Howitt, one of our own graduates, who has recently distinguished himself at Cornell University. We are glad to welcome Mr. Howitt, not only for his own worth, but because he is the only graduate of this College from the city of Guelph, and so we have one of our own boys back in the person of Mr. Howitt. Mr. F. H. Reed resigned during the year, and was succeeded, as Resident Master, by Mr. D. H. Jones. In the department of Chemistry, Mr. E. G. de Coriolis resigned as Demonstrator to accept a splendid position in sugar work in Cuba. His place was filled by the promotion of Mr. H. L. Fulmer, and Mr. G. G. White, of the graduating class of 1906, was appointed to succeed Mr. Fulmer as Demonstrator. In Macdonald Institute, Miss M. I. Speller resigned last September, and her place has been filled by the appointment of Miss Greist, of Pratt Institute of Technology, New York. We have added to our staff also during the past twelve months three persons, Mr. McMeans, a vegetable expert, in the Horticultural Department, Mr. C. C. Thom has been added to the Department of Physics, and Miss Helen Bigelow at Macdonald Institute in charge of the instruction in laundry work. I just ran over these to show you the changes of the year, and showing, I hope, substantial growth. In referring to the work generally, I would like to say that all the departments have been doing the most commendable work. There have been changes in one or two of them. I would like to call attention at this time to the department of English. In consultation with Prof. Reynolds last year he informed me that the department of English should be separated from the department of Physics, and more time should be given to the study of English Literature than had been given in the past; and hence Prof. Reynolds, although loth to give up the work in Physics, consented to release that work and take up the work of English, and devote himself entirely to it. We have thus for the first time this year, a distinct department of English. He was more willing to give up the department of Physics on account of it falling back on the shoulders of Mr. W. H. Day, Lecturer in the department; and so I am pleased to say the department of Physics has not had to suffer as if a new man were appointed who did not understand the work of the College and of the department.

At this point I must refer to something which has been, I am sure, in the minds of each one of you during the past week. I refer to the winning by a class of our College boys, of the trophy for judging cattle, sheep and swine at the International Exposition at Chicago. The boys did magnificently. I feel also that I should say a word about their training by Prof. G. E. Day, Dr. Hugo Reed, and Mr. H. S. Arkell, and I want to commend them in this public way for their persistence in not giving up after winning the prize last year. I had a letter from Dr. Mills to-day in which he says: "We are cheering for you down at Ottawa, but I must say we hardly expected it a second time. Please carry to the boys and to their instructors my sincerest sense of appreciation of their success."

Another point I must mention is the Experimental Union without Mr. Zavitz. If anybody had said to me that such a thing would be possible I would hardly have believed it. Mr. Zavitz has been heart and soul of this organization from its inception, and it does seem impossible that it should have been such a great success without him, but it has been a great success. Everyone who has come to my house to-day and yesterday says that the Union has gone right along with a full swing. I want to thank personally now in the presence of the students, Mr. John Buchanan for the way he has handled this work during the absence of Prof. Zavitz. (Applause.)

We have been honored more this year by distinguished visitors than in probably any other one year in the history of the Institution. They seem to have gotten into the convention habit, and different Associations have been vieing with one another to hold their convention here. The Governor-General has been here twice since we last met. His first visit was just one year ago. He wrote to the old land such a splendid report of it that his daughter insisted that he should bring her up here at a later date. They came again in May. We also had the Canadian Press Association. They adjourned from their meeting in the city of Toronto last spring and came up here and spent the entire day at the O. A. C. The Ontario Teachers' Association spent one day at Easter time, and six other Teachers' Conventions came to us during the year; as well as the Canadian Horticultural Society, composed of the florists of the Dominion, in the month of August.

I should not resume my seat without a word about Macdonald Institute. There may have gone abroad an idea in connection with Macdonald Institute that it is training school for public school teachers of Domestic Science. That is quite true, but that was not the object of the building of Macdonald Institute and the erecting of Macdonald Hall, although one of them; but rather that the girls and women of the Province of Ontario who cared to do so could come to this Institution, and here learn such things as would enable them to become better homemakers. When we selected the staff to teach girls just those things, we added others who would take up the academic side of it, as we thought we could very well train teachers under the same roof. But I want it to be distinctly understood that Macdonald Institute was founded in order that farmers' daughters, and others in the Province of Ontario, could get such an education as they were not able to get elsewhere. The larger portion of those in attendance at Macdonald Institute are here to make of themselves better homemakers than they could otherwise become. The total attendance at Macdonald Institute since its beginning, up to the present time, is 488 young ladies. Of these, 82 were admitted on matriculation standing for the purpose of preparing to teach Domestic Science in the public schools, and 352 have attended for the sole purpose of improving themselves in the art of homemaking.

With regard to the students in attendance at the College during the year 1906, I may say that in the General Course, there are 314; the specialists in the General Course work number 16; Dairy Course during this year, 74; Short Course in Stock and Seed Judging, 235; Short Course in Poultry Raising, 28; making the total students in Agriculture, 667. At Macdonald Institute there are in Domestic Science, 218; in Nature Study, 71; and in Manual Training, 11; making 300 in all, or a total of 967, and with the one who came in to-day from South Africa, 968 students in attendance at the O. A. C. during the year 1906.

PRESENTATION OF THE DRYDEN PORTRAIT.

Mr. W. J. Brown, in presenting to the College a portrait of Hon. John Dryden, made the following remarks: My purpose in addressing you at present is two fold: to pay a deserving tribute to a public man who is still in our midst, and who has given the best years of his life to the service of his country in developing its greatest industry, agriculture; and to add one more mark of esteem to our Alma Mater by decorating her walls with an example of the highest type of Canadian art.

An opportunity to publicly honor a benefactor does not often come

within the grasp of college alumni. Fortunately we are not alone in our desire to make the most of this occasion, as the members of the College staff and prominent agriculturists in all parts of Ontario have readily signified their interest and generously co-operated with us in this enterprise. This College, which stands in the foremost rank among educational institutions devoted to agriculture, belongs in a special sense to its students and ex-students who have been privileged to reside within its halls and gather instruction and inspiration from its associations and its professors. Our debt of gratitude can never be fully repaid. We can, however, be loyal to the traditions of our Alma Mater, and can reflect her glory by spreading her influence abroad. We have welcomed this opportunity to add something of value and beauty to her possessions especially as it not only enriches the College, but is at the same time a fitting recognition of public service.

The Hon. John Dryden became a member of the Executive Council of the Legislative Assembly of Ontario as Minister of Agriculture in 1890, and continued in this capacity until 1905. Those were fifteen eventful years in our history. It would take too long to describe the farming conditions of this Province as they were in 1890. The stagnation, depression and "hard times" that prevailed in those days are now merely matters of tradition, and the recollection of them is happily fading from our memories. Mr. Dryden was a breeder of pure-bred cattle and a practical farmer during all the years of his official leadership of Ontario agriculture. When he took the office it was with deep sense of his responsibilities, and a full realization of the needs and difficulties of the practical farmer. He became immediately a working Minister who originated comprehensive and far-reaching schemes that resulted beneficially to the whole country, because Mr. Dryden had his fingers on the agricultural pulse of this Province. It would not be right to give one man credit for the work of the many, but it is only fair to say that by his ability, foresight, able leadership and happy choice of assistants, Mr. Dryden was largely instrumental in bringing about many remarkable changes and effecting numerous improvements in the methods of farming in Ontario. He was a Farmers' Institute lecturer for some years before he became Minister of Agriculture, and he took a special interest in the development of the Farmers' and Women's Institute systems, which reach and help the average farmer under local conditions to improve his methods of farm practice, and the ordinary isolated farm home to catch the spirit of progress with the enlightenment and culture that inevitably follow in the trail of awakened intelligence. His efforts in behalf of the Guelph Winter Fair, and his success in securing the permanent establishment of that institution in this city are well known to you all. The Winter Fair and Fat Stock Show is a triumph of Ontario Agriculture. It merits and receives widespread recognition and support, and is being imitated already at Ottawa, and at Amherst, Nova Scotia, as well as in other parts of Canada. What he has done for the great dairy industry of this Province will never be realized nor fully appreciated. He was always an enthusiast in behalf of improved live stock, and has exerted a powerful influence in developing this the greatest of our agricultural industries. The betterment of our flocks and herds has been with him almost a passion. In 1901 he said he hoped to live long enough to see the day when all the "scrub" stock would be removed. He encouraged, assisted, and promoted by every means at his command, fruit growing, poultry raising, beekeeping and kindred interests, and enabled them to attain their present high state of efficiency. His greatest work, however, was in behalf of scientific and practical agricultural education. Aside from

his duties as an administrator this was his chief concern. This College and Experimental Farm were his instruments, the numerous organizations, publications, etc., of his Department were his avenues for the dissemination of knowledge, while the farming communities of this vast Province comprised his field. It has been our privilege to witness many gratifying results of this mighty work. For example, this College from small beginnings and inadequate buildings, has become one of the greatest of its kind, a revolution in farming methods has taken place, farm values have increased, the revenues from farm products have doubled, social life in rural communities is immeasurably more attractive than heretofore, while the sunlight of agricultural science has illuminated the whole land. But the fruition of Mr. Dryden's plans is not yet completed; each year will widen their scope and each decade multiply their benefits. Truly he has been among our leading public benefactors and well deserves the thanks of a grateful people.

Mr. Dryden's pre-eminence as a practical Canadian agriculturist has been recognized by the Government of the motherland. During the present year it has been his privilege as a Royal Commissioner, to investigate agricultural conditions in Ireland. This is the first time in our history that an honor of this character has been bestowed upon a Canadian. It is another act in recognition of our place in the sisterhood of nations forming the corner stones of Empire.

The most striking personal characteristics of Mr. Dryden are his modesty, fairness, and loyalty to the highest ideals of public service, while his administration was conspicuous for its strength, perseverance, wisdom, and moderation. He was the chosen representative of a great political party, and accepted and discharged his trust as such, yet in his estimation the interests of the whole people, in a country in which agriculture is supreme, were greater than those of the Party; therefore, in the conduct of his Department he was non-political. His successor seems to be taking the same enlightened view of his duties and his opportunities.

The many generations of students that have passed through these halls have felt the impress of Mr. Dryden's personality. His dignity, gentle manners, integrity, and enthusiasm have been a source of inspiration to hundreds of young men who are to-day "pushing to the front" in this and other lands. I now have the honor to present to the Ontario Agricultural College this portrait in oil of the Hon. John Dryden, painted by E. Wyly Grier, R.C.A. This is an expression of our appreciation of Mr. Dryden's personal worth and splendid service to this country. (Applause.)

Hon. Nelson Monteith: It is my pleasant task, on behalf of the College and on behalf of the Government, to accept at the hands of the ex-students and other agriculturists this splendid portrait of the Hon. John Dryden. I trust that as it hangs upon the walls of this Institution it may be an inspiration to the young men, as years go by, and stimulate them to greatest efforts in all walks of citizenship. I desire to echo, in part, the remarks that have been made by Mr. Brown. To-night we are paying a tribute to a man who is still alive to partake of the honour. It is generally looked upon as a human frailty to say a great many good things about a man after he is dead, especially a man who has been engaged in politics, but this is a notable exception; and I trust that as years go by it will be a privilege that you will feel in duty bound to perform to public men who are still in active work, who have done public service and good service.

This presentation is somewhat of a pleasant variation from what is usual on such occasions. It is needless for me to say much about the work

that Mr. Dryden has performed while occupying the position of Minister of Agriculture. The memorial of his work is largely evidenced in the increased comfort seen in the homes of the agriculturists throughout the length and breadth of this great Province. I believe it is through his influence to a large extent that a higher standard of living has been set up. That, I believe, in itself, is one of the highest tributes we can pay to the Hon. John Dryden. It has been his singular good fortune to have been the agent to bring that condition of things about, but remember that this great work is not yet fully accomplished. I look to the young men, to the student body, to go out among them and still further raise the ideal of life upon the farm. I believe you are the leaven that is able to do it; but remember you have a great task before you. It is an inspiration to look around on the splendid student body we have here to-day, and feel that they are being imbued from day to day with higher ideals as citizens of this Province.. We have a great Province—a Province whose resources as yet are but simply touched on the surface. We have a Province of boundless possibilities, and though there are a great many people who are prone to speak of the west as the Eldorado to which young men should turn their faces, I believe there is a greater and grander future for the young men who stay right here and take an active part in the duties of citizenship. My wish is that they may rise to positions of honor and trust, and that they may fill these positions as well and as honorably as the position of Minister of Agriculture has been filled by the Hon. John Dryden.

Hon. John Dryden, in responding, said: This is one of the occasions on which a man can be very happy and yet very much embarrassed. That seems to be my position. I feel a littlt different from what I have ever felt before, when I have undertaken to talk to students and ex-students on occasions like this. The matters are a little too personal, and it breaks one up.

Before I go further, may I be allowed to say a word for the artist who has done the work you are now looking upon? I happen to know something of the effort which has been put forth by him, and it appears to me that he has not only made an excellent likeness, but rather improved on the original. Of course that is why I like it so well, but if you had seen, as I saw—because I was there—the energy, the determination, the enthusiasm, which the artist put into his work, I am sure you would appreciate it possibly more than you do now. I think he deserves great credit, and I want to say a good word for him, although he is here.

I suppose the real occasion of this splendid gift, so far as I am concerned, and the honor which has been done me, is because of the effort which I was permitted to put forth during the years of my occupancy of the Department of Agriculture for the advancement of practical agriculture in this country. Now, the action of the student body has brought to my mind very forcibly two words, and these words are quite the opposite one of the other. The first one I do not like to mention; it always sounds bad to me, and the word is "Forgotten." How soon a public man is forgotten! People have not time to look back and think about the men who used to be; they are thinking of the men who present themselves before them just now. And so it must happen that, little by little, as the days and years roll by, the men who were in action a few years ago are forgotten. What I like about it is that so far as this institution is concerned, and so far as my work in connection with agriculture is concerned, the students and ex-students have made it impossible that John Dryden should be forgotten. They have wiped out that word altogether, and have written another and a much better one in its place, that is, "Remembered," and it brings joy to everybody's heart to

know that they are in the memory of their friends. So in the future, as people come to see this portrait and enquire who it is, the name and the work must, I think, always be associated together.

This occasion carries me back to the years gone by. To-day I was out on the campus, and I was trying to see the campus as it was when, about seventeen years ago, I took possession of the Department of Agriculture and began to interest myself somewhat vigorously in this particular institution. It was not the same then as it is now. Perhaps the main College building itself looks somewhat similar, but it has been greatly improved since then. In that building you had the dormitories and dining room, and it contained a museum, or what there was of a museum, and library and class rooms. The only other building we had here was a one-story building where the present chemical building is. Unfortunately that building was destroyed by fire, but it was rebuilt during my time. There was no gymnasium. I do not know what the boys would do without a gymnasium now, but you will never know what kind of a fight I had to get one for you—a fight inside the Cabinet and a fight outside— and yet we quietly stuck to the job and won the day. Then there was no experimental building; neither was there any stock judging pavilion, and I had to fight like a Trojan to get that. My colleagues did not understand the use of it; they could not understand, as I did, the need of it; and yet it is one of the most useful buildings we have here. Of course in those days there was no poultry department and no Dairy School. We thought we would make provision out of the old Dairy Building which stood there when I first took office for a Dairy School which would accommodate fifty students, and when we opened our doors one hundred men presented themselves. As there was only room for fifty you may understand what happened. I went to my colleagues and said: "I must have another building. I want you to give me money to put up a regular Dairy Building, with all the appliances necessary." Everybody knows I was right. All this came back to me when I stood out on the campus to-day, and thought of the beginning of things some sixteen or seventeen years ago. We had one department after another brought into use. The Horticultural Department—does anybody here remember it as I saw it in those days? It was in a building that looked like an old root house. I had to put my head down to keep from striking the roof as I walked through it. It was a very good root house, but that is about all. We said we wanted a proper building, and we got it by and by. I am glad I did all this, and I am glad I had the courage to stand up against these men who did not have correct information about what was needed. To-day there is nobody fighting Mr. Monteith on any subject; and if he ever gets into trouble along that line I ask him to send for me, and I will try to help him.

However, it is not in these College buildings that the College lives as a vital force in this country, but it is in the student body; and if the College fails to inspire these young men and to give them a new zeal to fit them for the best service and point them to higher things than agricultural production, I must say they have missed the opportunity which is afforded by this splendid equipment we have here.

I noticed that Mr. Brown in his address suggested that all the credit of what this College has accomplished ought not to be given to your humble servant. I want to emphasize that statement. Why, Mr. President, what could I have done here without Dr. Mills? Where would have been all my energies? I could not have accomplished anything along these lines if I had not had a man here to carry out the letter of what was proposed; to spend

his days and hours scheming all these things and making everything go harmoniously. I want to say that we have not yet begun to appreciate Dr. Mills at his true value. He put his best life and best days into this institution. He was a true and scholarly gentleman at all times, and the boys know it. He was sometimes a little severe in his discipline, but he loved every one of you all the same, and there is not a boy here who knew him who does not allow that that was the case. He would do anything then to help you if you were in trouble, and he would do anything to-day. He was a man of great force and untiring energy; he was a man of great reserve, and when he was foiled and could not get what he wanted in one way he would try another way. He wanted these buildings that are going up here now, but if he had stayed here he would have shown you what a resourceful man he was. No one knows of how much value Dr. Mills was to me in this work. Perhaps I ought to say that we were the complements of each other. I could not have accomplished the work without Dr. Mills. I do not know whether Dr. Mills could have accomplished it without me, but at all events he did not do it before.

Then there were others. I don't like to mention names, in case I should miss some, but what could I do teaching agriculture in this College without Prof Day? I spotted him; Dr. Mills spotted him. We had in our mind what would be done, and we took him as a raw recruit out of the student body, and he has proven his worth. You heard Mr. Ross talk about the Experimental Union growing; there is a man who is growing; Prof. Day is a stronger man to-day than he was five years ago. Prof. Dean is another taken out of the student body at that time; he has made his mark all over the country in his particular line. Then followed Reynolds, Harrison, Graham, Reed, Hutt, Harcourt. If I was able to do anything, it was by the work accomplished through these men. I must not forget to mention Zavitz, that enthusiastic experimenter. What would the College do without him (Applause.) Mr. Zavitz's department has advertised the College year after year, and I was very glad to push him along as fast as I could in any direction in which he sought to go.

There is one other thing I would like to touch upon, and that is the reference which Mr. Brown made to the personal influence I was able to exert upon the students as they passed through this College. Now, to have touched the lives of these young men for good, to have given them any inspiration, to have presented to them nobler aims than they had before, I think is by far the greatest achievement that I could imagine concerning myself. The erection of these buildings is nothing in comparison with that. Nobody knows when two or three of these young men are lifted up to a higher plane how far the influence is going to extend. The influencing of these young men going out into the world's work, I say, is vastly more important than any other part of the work that has been accomplished.

A word as to the future. What of the future of this institution? Well, it depends, I suppose, on how well the equipment which is now provided is used. It does not depend on formalities merely; it does not depend on best records. I was proud as a Canadian when I heard a young man tell what had been accomplished, but it does not depend on the prizes which have come from the east or the west, or from anywhere. It depends upon the uplifting influence on the students who come to take a course here; it depends on the inner life; it depends on the soul life of the institution. It is life we are touching here; it is character we are seeking to form here—solid, good character, which will tell on the general character of our Canadian people as the years go by. Men in my position see so much of wasted life, so many might-

have-beens, so many human wrecks. It seems worth while for a man to prevent them so far as possible; and so I say here is a great opportunity in that respect where we are dealing with life from day to day and year to year.

Speaking of the future, I want to say our country needs—more than she ever needed before, perhaps—earnest, loyal men, well equipped workers; not drones, not slaves merely, but independnt, energetic workers. We want an aggressive, sturdy lot of men going out of this place, because this is the one place, and the best place, I know of in Canada at present to produce them. And I want to say to you young men who are listening to me that I do not want you all to go west. By and by we will have an influx back again; mark my words. They are going out there for the dollars. Do not let that be the highest ambition of your life. I do not object to you getting as much money as you can; I don't want to hinder you in the slightest degree, but we need you in old Ontario to-day, and we shall need you more. There is much to be done; there are leaders wanted. If I were twenty-five years younger I should like to throw all my ability into the work which I see needs to be done here in Ontario. I have been all over Ireland; I have mingled among her people, and I want to tell you that before you know where you are Ireland will get right ahead of you, because they are working along these lines, and an effort is being made to teach them to co-operate to help one another. It is slow work there, but it is work that needs to be done.

There is plenty of money in agriculture, but the farmer does not get it; it is divided up because there is such a tremendous gulf between the producer and the consumer. I myself am a producer down in the County of Ontario, and a consumer in the City of Toronto. Somebody is in between the producer and the consumer. The producer does not get by a long way what the consumer has to pay. He does not get his share. There is not the same kind of organization and co-operation which will bring the two classes nearer together. I do not want to see, so far as I am concerned, the gulf growing wider than is necessary.

I want to say one word, and then I will finish. My sympathy, whether I am in the Government or out of it, is with the man who is living on the soil, and I would do anything I could for him. During my time here I did try to help these men, and the influence I could exert was brought to bear for them on every occasion. It is worth while, whatever your station or position, to help these men living on the soil, and I am glad that this institution, which had my care for so many years, is doing what it can to supply the men that are needed. In conclusion, I wish to offer my most hearty thanks to the students, ex-students, and others who have so nicely expressed their appreciation of my services to Ontario by the presentation of this splendid portrait.

Thirty-Eighth Annual Report

OF THE

Fruit Growers' Association

OF

Ontario,

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1907

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

To the Honourable William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Ontario Fruit Growers' Association, for 1906.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1907.

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Fruit Growers' Association of Ontario.

OFFICERS FOR 1907.

President.....HAROLD JONES, Maitland.
Vice-President.....ELMER LICK, Oshawa.
Secretary-Treasurer.....P. W. HODGETTS, Parliament Buildings, Toronto.

Directors:

Agricultural Division No. 1.....A. D. HARKNESS, Irena.
" " " 2.....A. A. WRIGHT, Renfrew.
" " " 3.....HAROLD JONES, Maitland.
" " " 4.....W. H. DEMPSEY, Trenton.
" " " 5.....WM. RICKARD, Newcastle.
" " " 6.....ELMER LICK, Oshawa.
" " " 7.....A. W. PEART, Burlington.
" " " 8.....G. A. ROBERTSON, St. Catharines.
" " " 9.....H. H. GROFF, Simcoe.
" " " 10.....A. E. SHERRINGTON, Walkerton.
" " " 11.....A. O. TELFER, Ilderton.
" " " 12.....D. JOHNSON, Forest.
" " " 13.....C. L. STEPHENS, Orillia.

Ontario Agricultural College: Prof. H. L. HUTT, Guelph.
Honorary Directors: THOS. BEALL, Lindsay; A. M. SMITH, St. Catharines; W. T. MACOUN, Ottawa.
Auditor: J. M. DUFF, Guelph.

REPRESENTATIVES TO FAIR BOARDS AND CONVENTIONS.

London: JAS. S. SCARFF, Woodstock; A. O. TELFER, Ilderton.
Ottawa: R. B. WHYTE, Ottawa; A. A. WRIGHT, M.P., Renfrew.
Toronto: W. H. BUNTING, St. Catharines; P. W. HODGETTS, Toronto.

COMMITTEES.

Executive: President, Vice-President, and Secretary, with W. H. BUNTING and A. E. SHERRINGTON.
Board of Control, Fruit Experiment Stations: G. C. CREELMAN, Chairman; Prof. H. L. HUTT; P. W. HODGETTS.
Elected by the Association: A. M. SMITH, W. T. MACOUN, G. A. ROBERTSON.
Transportation: W. H. BUNTING, R. J. GRAHAM, D. JOHNSON, W. L. SMITH, ROBT. THOMPSON, H. DAWSON.
Co-operation: A. E. SHERRINGTON; D. JOHNSON, Forest; J. E. JOHNSON, Simcoe; ROBT. THOMPSON, W. H. DEMPSEY.
New Fruits: Prof. H. L. HUTT; W. T. MACOUN; E. MORRIS.
Historical: ALEX. MCNEILL; T. H. RACE; L. WOOLVERTON; H. H. GROFF; W. H. DEMPSEY.
Fruit Show: W. H. BUNTING; A. W. PEART; ELMER LICK; P. W. HODGETTS.

Fruit Growers' Association of Ontario.

ANNUAL MEETING.

The forty-seventh annual meeting of the Fruit Growers' Association of Ontario was held in the City Hall, Toronto, on the 6th, 7th, and 8th of November, 1906.

REPORT OF THE EXECUTIVE FOR 1906.

Your Executive have met formally during the past 12 months on four occasions. Early in the new year, it was seen that the clauses relating to affiliated associations, as adopted at the last annual meeting, would not be workable under the conditions existing at the latter time. In November, when the changes were made, the numerous horticultural societies in the Province were nominally eligible for affiliation, and as these societies were receiving government assistance, it was thought that the affiliation fee should be fixed as high as 75c. per member. The day following the close of the fruit convention, representatives of the horticultural societies met and formally organized the Association of Horticultural Societies of Ontario. This action relieved the Fruit Growers' Association of any further necessity of looking after the interests of these societies, and at the same time changed entirely the outlook for membership during the coming year. None of the local Fruit Growers' Associations were receiving Government assistance and were unable to pay the high fee of 75 cents per member.

A meeting of the Executive was at once called for Jan. 2nd, at St. Catharines, and after a thorough discussion, the following resolution was drawn up:

Moved by W. H. Bunting, St. Catharines, seconded by Harold Jones, Maitland, that "After consideration by the Executive Board, of the best means of encouraging the formation of local Fruit Growers' Associations upon a satisfactory basis, and the consolidation of said local Associations with the Provincial Association, it is hereby resolved that we deem it in the interests of the Ontario Fruit Growers' Association to modify sections 25 and 27 of the present Constitution to meet the exigencies of the situation, by making the following changes in the aforesaid sections; that is to say, in Section 25, the words 'seventy-five' be changed to 'fifty,' and Section 27 to read as follows: 'Each affiliated Association may send one duly accredited delegate to the Annual Meeting, one-half of whose actual expenses shall be defrayed by the Provincial Association.' It is hereby understood that the above changes are subject to the approval of the Minister of Agriculture for the Province."

In accordance with the last clause, the report was submitted to the Hon. Mr. Monteith, and after a thorough explanation, was formally ratified by him. Notices of these changes were at once sent to all interested parties, including the officers of all fruit growers' associations throughout the Province, and the result this year has been very encouraging.

At the same meeting, a committee consisting of the President, Mr. Bunting, and the Secretary were appointed to wait on the Deputy Minister of Agriculture with a view to making all proposed changes in the Agriculture and Arts Act harmonize with the revised constitution of the Association. In accordance with the request of the Executive, a meeting was held in Toronto with Mr. James. The points likely to conflict, such as the number of directors, the membership fee, etc., were talked over, and an agreement reached that was satisfactory to both parties. The new Act which comes into force in the spring of 1907 allows of greater diversity among the Associations in respect to the method of election of directors and other vital points, but makes all revision of constitutions subject to the approval of the Minister of Agriculture.

A third meeting was held during the Toronto Exhibition to consider matters relating to the Annual Convention and the Fruit Show. A draft programme was submitted and various topics suggested. The Secretary was authorized to write to J. H. Hale, the noted peach grower of Georgia and Connecticut; Roland Morrill, of Benton Harbor, Michigan, and Prof. H. A. Surface, of Harrisburg, Pennsylvania, in reference to attending the convention, but was unable for various reasons to secure their services. Prof. Surface wrote that he would accept the invitation, but wired on Nov. 30th that he could not come. Mr. E. D. Smith, owing to illness, was also compelled to refuse our invitation at the last moment. Prof. P. J. Parrott, of Geneva, N. Y., took Prof. Surface's place.

Judges were appointed for the various classes of fruit at the Show, and an allowance of five dollars was voted to each to help pay their travelling expenses. An allowance of $20 and expenses was voted for the work of a Superintendent to assist the Secretary for the week of the Show. Mr. Kydd, of Simcoe, who had been appointed by your Board, was unable to undertake this work, and Mr. Reid, of St. Catharines, was asked to take his place. Mr. Reid has had considerable experience in such work, and was Secretary of the Niagara District Horticultural Exhibition, held in St. Catharines this summer.

The resignation of Mr. T. H. Race, of Mitchell, your Director for Division 11, was received and accepted, and as the end of the Association year was so close it was decided not to appoint a successor. Mr. Race has been connected with the Association for many years, has occupied the position of Director since 1890, with the exception of the years 1892-93-94, when he held the office of Vice-President and President. He felt that his absence from the country in his position as Commissioner to the New Zealand Exposition would take so much of next year that in fairness to the Division he represented, he should leave the office open to some one more likely to be of use to the Province and the Association.

On Sept. 14th, a meeting was held at St. Catharines to consider the question of a further revision of the Constitution rendered necessary by the new Act respecting Agricultural Associations which comes into force in 1907, and also by the changed conditions in regard to general representation, as expressed by many of the best fruit growers of the Province. Much adverse criticism of the present mode of election of Directors has been given during recent years, and it has been thought wise to allow the members of the Association an opportunity this year of expressing their opinion on the wisdom of the new method as adopted by the Vegetable Growers' Association and proposed for the two Dairymen's Associations. In addition to the Executive, there were present at St. Catharines, Mr. Murray Pettit, of Winona;

Mr. Ruddick, of Ottawa, and Mr. H. B. Cowan, of Toronto. After talking the matter over thoroughly, a sub-committee consisting of Messrs. Scarff, Pettit and the Secretary were appointed to draft out the proposed amendments in consultation with Mr. Cowan.

This Committee met on Oct. 17th, and drew up the report, which has since been submitted to each of the members by circular letter. The matter will come up on Wednesday afternoon, and it is to be hoped that something definite and feasible will then be decided upon.

Membership.

The total number of members up to the close of the year is 434. Of this number 300 have been sent in by 13 associations, thus constituting 69 per cent. The associations represented are as follows:—Niagara District Association, Arkona, Forest, Ilderton, Meaford, Orillia, Southern Ontario, Burlington, Jordan Harbor, Clarkson, Newcastle, and Oakville. The individual members have been received from various sources, chiefly by letter from the members direct. About 50 names were secured at the time of the last convention. All of those who joined the past year are men connected largely with fruit growing, the men whom we are most anxious to reach and who should take a vital interest in our association.

It will be seen that these affiliated associations are widely scattered and represent the Province fairly well except in the eastern part. Associations are, however, now started at Belleville, Trenton and Oshawa, and should these affiliate, the fruit sections of this portion of the Province will be better looked after. Your director for Division 3, Mr. Harold Jones, has expressed the hope that he will be able to get together an association of ten or more members and keep alive interest in fruit growing at the extreme eastern part of the Province where, in the St. Lawrence Valley, the Fameuse apple and kindred types succeed to perfection.

In connection with the question of membership Mr. Race's work in organizing and securing the affiliation of several associations during the year is worthy of special mention. His long acquaintance with the fruit interests of the Province and the enthusiasm that he arouses by his addresses have strengthened all of the associations that he visited.

Co-operative Work.

The formation of co-operative fruit shipping associations has proceeded steadily under the influence of the co-operative committee and with the help of the Department of Agriculture through Mr. Putnam. A number of joint meetings were arranged for during March and April and were addressed by Messrs. Sherrington, Johnson, Carey and Gifford. In addition, Mr. Sherrington visited several points by special request and succeeded in putting several associations in good shape for work this fall. About 18 associations are now in running condition and the outlook for the fruit-growers in these sections is brighter than for many years.

Two meetings of the co-operative committee have been held during the year. A full report of their proceedings will be given on Thursday afternoon. Owing to the efforts of Mr. Sherrington, the Chairman, a union of most of the associations now in existence was effected at the second meeting on August 14th, and a new association, purely commercial in its aims, was organized, to be known as the Ontario Co-operative Fruit Growers' Association. This new association will relieve your association of the burden of undertaking work outside of its regular aims, and at the same time will per-

mit of further expansion of the co-operative idea, such as placing representatives in the markets, opening up new markets, etc. We hope to receive an extended report on the work of this association on Thursday.

The Transportation Committee met in Toronto on January 16th and discussed matters that were likely to come before the Dominion Conference. A recommendation was made that the expenses of three of the delegates to the west in 1905 be paid by the association. These men were sent out to watch the treatment received by the fruit cars en route to Winnipeg, the condition of the fruit on arrival and other points of interest to the growers. The railways provided the transportation both ways. In accordance with this recommendation the sum of $36.75 has been paid to two of the men to cover their actual expenses.

The committee were very strong in their demand that the express companies be placed under the control of the Railway Commission. This matter was brought to the attention of the Cabinet at the time of the Conference, and as a result the rates of these companies were by law made subject to the Railway Board. Two of the objects for which this committee have persistently fought, the placing of both express and freight carrying corporations under control of some board to which appeal could readily be made, have thus been accomplished. It now remains to prepare as much information as possible of all grievances against the companies, so that in case of appeal to the commission, your committee may be in possession of as much evidence as possible in support of their claims.

The county prize scheme, originated by Mr. McNeill a year ago, and adopted by fifteen counties for our previous show, was carried on again with slightly better success this year. The correspondence in connection therewith is enormous, as over 500 councillors alone had to be written to this year, together with local committees, clerks and other parties interested. Twenty-five counties were asked for the grant of $25 and only five of these refused, namely, Elgin, Middlesex, Wentworth, Carlton and Huron. The twenty counties offering the prize are as follows:—

Brant	Lambton	Perth
Bruce	Leeds and Grenville	Prince Edward
Essex	Lincoln	East Simcoe
Grey	Norfolk	Stormont, Dundas and Glengarry
Halton	Northumberland and Durham	Victoria
Hastings	Ontario	York
Kent	Oxford	

Local parties in every instance were asked to choose the ten varieties best suited to their conditions and the whole list was then printed in the special prize list which was distributed, together with entry cards, as widely as possible. While every county is not yet as well represented by entries as we would like, the result is still very gratifying, as over 500 entries have been received.

Your secretary has to specially thank in this connection, those gentlemen who were so active in waiting on the county councils at the June meetings in support of our application for these grants. All of the directors have rendered good service, and in addition I desire to mention Mr. Robt. Thompson, of St. Catharines; Mr. C. L. Stephens, of Orillia; Mr. A. Gifford, of Meaford; Mr. Harry Dempsey, of Rednersville; Messrs. Fraser and Johnson, of Leamington; Mr. D. Johnson, of Forest; and Mr. W. D. A. Ross, of Chatham; Mr. J. C. Harris, of Ingersoll, and several others. These voluntarily took the time to attend the council meetings and were afterward enthusiastic enough to help advertise the scheme as thoroughly as possible. That they have been successful is shown by the number of entries.

Horticultural Exhibition.

The exhibition of last year was generally admitted to be the finest of its kind ever held in Canada. The attendance, however, was still below the mark, and as a result there was a deficit of between $400 and $500. The city council gave an additional sum of $250 on condition that the remaining sum be collected. This was undertaken by the general committee and successfully accomplished. It was felt that if the people of Toronto and the Province generally could be brought to realize the value of the show that its financial success would be assured. It was, therefore, determined to continue the show for another year and to make a still greater effort to get the attendance of the people.

The general committee have met during the year at frequent intervals; in fact during the last two months every Monday night. The special committees have also spared no effort this year to complete their work in every detail. After much thought and very careful consideration, it was decided to procure a first-class musical attraction for the week of the show, and after some correspondence the Black Dike Band, of England, which was on a tour of the world, was engaged for nine performances at a cost of $2,000. The additional expense seemed enormous, but it was felt that it would be necessary to procure the best talent obtainable, and if the citizens of Toronto will patronize these concerts as they are in the habit of doing, there should be a much better financial statement to present this year than last.

The general prize list was ready for distribution much earlier this year, coming out about a week later than the date set by the directors. The fruit sections were printed in the July issue of the Canadian Horticulturist in accordance with directions from the board. All of the directors and as many other interested parties as possible were asked for criticisms and suggestions on last year's lists, and after much labor by the Show Committee the present list was adopted. Changes have been made in Classes 3 and 4 where the varieties called for have been specified. Owing to lack of competition, the section for hot-house grapes have been struck out. Several changes in varieties in the other classes were made to encourage greater competition. In the package sections increases were made in the prizes to bring them up to a better equivalent of the value of the fruit which has, in the case of prize lots, become the property of the association. In all about $130 was added, making a total of $907, or with the county prizes added, $1,407.

The entries are well scattered over the Province, and exclusive of the county specials are about 300 in excess of last year, numbering as follows: Barrels, 63; boxes, 193; baskets, 13; plates, 442; pyramids, 43; collections, 5; jams, preserved fruits and jellies, 192.

The office labor alone in connection with these 1,392 entries has become so great that two extra clerks have been working on them since last Monday. The expenses of the show of 1906 will be considerably greater than that of 1905, the county specials having added much to both labor and expense.

Dominion Conference.

A full report of the proceedings of the conference has been published and generally distributed. The nine delegates appointed by the board at their last meeting were all in attendance, with the exception of Mr. Hilborn, owing to ill health, and Mr. Thompson, who was in British Columbia. Their places were taken by Mr. Ross, of Chatham, and Mr. Stewart, of Homer. Mr. Scarff and your secretary were also in attendance, as well as a number of other members, including Prof. Hutt and Mr. Woolverton.

The results of this conference will be discussed by Mr. Bunting and Mr. Peart before the association on Wednesday. It is to be hoped that the fruit growers of the Dominion will hold the Minister of Agriculture to his word to call such a conference at regular intervals. The work accomplished this year was invaluable, but there remains a very great deal yet to be done.

The Ontario delegates met at the Walker House on the day previous to the opening of the conference and thoroughly discussed the questions that had been proposed by the chief of the fruit division as worthy of attention. The instructions of the last annual meeting were also considered, and by the joint expression of opinion the delegates were much better prepared for the conference.

Annual Meeting.

The suggestion has been made that should the annual show be continued it would be better to have the annual business meeting of the association some time after the New Year. The rush to get through a lengthy programme, see the exhibition, attend committee meetings, and, in many cases, place and look after exhibits, has become so great that one or other of these objects must suffer. Many of the other Associations have adopted the above plan, holding their show and lectures at one time and the business meetings at another.

Very good reasons can be shown in favor of this plan with your association. First, the fruit growers are just beginning to close up one year's work and are not in the least prepared to discuss definite plans for another season; second, as the financial year closes before the heaviest expenditure of the year is incurred (for the annual meeting and show) a false idea of our finances is conveyed to outside parties, including the Minister of Agriculture and other members of the Legislature, as well as to many of our own members; third, owing to the hurried nature of all our proceedings as mentioned above, the business of the association is carried on at irregular hours and undoubtedly suffers in consequence. The above change might very well be brought before the general meeting and thoroughly discussed preparatory to making the change another year. According to our present constitution, the date of the annual meeting shall be decided by the association from year to year.

In closing this report your executive desire to thank you as directors, for the interest you have shown in the various schemes taken up during the year.

Respectfully submitted on behalf of the executive,

P. W. Hodgetts.
Secretary.

TREASURER'S REPORT 1905-6.

Receipts.		*Expenditures.*	
Balance on hand October 31, 1905	$ 924 32	Show	$1,010 08
Fees	293 55	Horticulturist	453 33
Horticulturist	2 47	Annual Meeting	295 83
Show	482 52	Committees	282 70
Legislative grant	1,800 00	Postage	55 47
County Councils	110 00	Audit	8 50
Sundries	12 40	Salaries	300 00
		Incidentals	211 07
		Balance on hand October 31, 1906	1,008 28
	$3,625 26		$3,625 26

DETAILS OF EXPENDITURE.

Show: J. H. Dunlop, Treasurer of Exhibition, 1905, $200.00, 1906, $300.00; P. W. Hodgetts, $61.70 (express, $22.10; cartage, $5.75; labor, $18.00; paper, napkins, plates, etc., $15.85); Bryant Press, County Prize Lists, $5.50; J. Curtis, printing cards, $4.00; Brown Bros., Judges' Entry Books, $21.75; Canada Stationery Co., Prize Lists, $4.00; Model Cartage Co., $24.50; Toronto Cold Storage Co., $44.45; C. M. Henderson, Auctioneer, $8.60; A. McNeill (expenses of County Prize Scheme, 1905), $23.95; printing, etc., $4.90; labor, sending out Prize Lists, etc., County Prize Scheme, 1906, $10.85; refund County Councils (prizes unawarded), $73.55; prizes, $37.00; express and freight, $30.26; refunds for fruit sold, $103.57; T. B. Rivett, assistant at show, $22.00; Methodist Book Room, printing Prize Lsts, $24.50..... $1,010.08

Horticulturist: Periodicals for members, $219.30; calls on stock held by Association, $200.00; legal expense drawing up agreement, $14.63; index, 1904, $19.40 ..... $453.33

Annual Meeting: Travelling expenses, A. N. Brown, $34.00; G. C. Caston, $7.50; R. B. Whyte, $18.10; T. H. Race, $14.50; A. E. Sherrington, $9.35; E. Lick, $7.60; Thos. Beall, $9.30; Wm. Rickard, $7.75; Jas. S. Scarff, $12.25; C. W. Vanduzer, $8.50; H. H. Groff, $11.60; M. Pettit, $6.35; A. M. Smith, $10.25; W. H. Bunting, $13.65; W. H. Dempsey, $7.83; J. L. Hilborn, $17.80; H. Jones, $11.70; A. D. Harkness, $15.80; Methodist Book Room, programmes, $10.75; W. B. Varley, reporting, $50.00; H. B. Cowan, lighting and heating hall, $11.25 ..... $295.83

Committees: Travelling expenses, Robt. Thompson, $5.25; W. H. Bunting, 1905-6, $80.75; A. W. Peart, $4.50; Jas. Scarff, $45.45; M. Pettit, $13.50; A. D. Broderick, $17.00; T. G. Bunting, $19.75; W. D. A. Ross, $10.10; D. Johnson, $17.20; A. D. Harkness, $12.60; T. H. Race, $15.05; A. B. Foran, $4.60; Harold Jones, $36.95 ..... 282 70

Postage: Mrs. Hubertus, $52.00; cash, $3.47 ..... 55 47

Audit: J. M. Duff, $8.50 ..... 8 50

Salaries: P. W. Hodgetts, $300.00 ..... 300 00

Incidentals: C. Gripton, rubber stamp, 80c.; Bell Telephone Co., $2.05; Library Bureau card index, $4.20. T. H. Race (organizing Associations), $93.20; Horticultural Exhibition (one-half page ad. in Prize List), $11.00; Bank of Commerce, exchange, 75c.; G. N. W. Telegraph, $1.09; Methodist Book Room, printing and stationery, $39.25; Jas. Dorman, office assistance, $5.00; Miss A. M. Fox, stenographer, $40.00; Curran Bros., printing, $4.60; Brown Bros., binding, $1.75 ..... $211 07

Examined and found correct, this 2nd day of November.

(Signed) J. M. DUFF,
Auditor.

PRESIDENT'S ADDRESS.

BY JAMES SCARFF, WOODSTOCK.

My first duty to the members of the Ontario Fruit Growers' Association is to sincerely thank you for the honor which you conferred on me one year ago in my election to the responsible position as President of this Association, notwithstanding my inability to fill such an important and responsible position with such ability as my predecessors. However, I am free to confess that with the assistance I have received from my co-directors, a great deal of good work has been accomplished during the year; and I take this opportunity of expressing my sincere thanks to them and more particularly to the members of the Executive, for the very valuable assistance I have received from them during my term of office.

I am pleased to congratulate the officers and members of the Association on a successful year's work, and I believe our work is of the greatest benefit to the fruit growers of this country.

Our finances, as you will see by the Treasurer's report, are in a good and satisfactory condition. This year has been one of special progress for our Association, and the financial statement shows a good balance in hand, which reflects credit upon the management of the Executive.

The fruit crop of 1906 has been fairly good over the Province generally. The demand for Canadian fruit has been greater than ever, and prices decidedly firmer. The trees and vines have matured an abundance of excellent wood, making the prospect for next year's crop a good one. I regret that I am unable to give a full report in regard to the past season's crops, not having the opportunity to gather any reliable information from the various sections of the Province. The season opened with an extraordinary show of bloom, but in many cases the bloom did not set owing to cold and continuous rains during the blooming season.

The apple growers in some localities report a good yield, others light. Storm and insects during the latter part of the season have depreciated the supply of marketable fruit. Reports from British markets indicate that both American and Canadian apples for export are moving slowly. So far only 60 per cent. has left the Atlantic ports up to the same time the last two years, and the indications are that prices will be satisfactory, and good prices are now being paid growers for well packed stock of the best quality. About the middle of October, frost and a heavy snowstorm did some damage to fruit orchards in some localities in Ontario and in New York State.

I had the pleasure of attending the Dominion Conference in Ottawa, on March 21st and 22nd, where about 100 delegates were present. This conference was successful to a remarkable degree in settling many vexed questions of national interest. The meeting was thoroughly representative of the fruit interests of Canada, delegates being present from Prince Edward Island to British Columbia.

The convention was opened by Mr. J. A. Ruddick, Dominion Dairy Commissioner. After a few words of welcome, he called on Hon. Sydney Fisher to take the chair for the rest of the session. The honorable gentleman was given a very hearty reception. In opening, he pointed out the purpose of the convention as having been called to discuss matters of a national significance affecting the fruit industry, suggesting as to whether it would not be advisable to form a Dominion Fruit Growers' Association. He also submitted to the delegates' attention the question of the Fruit Marks Act, which, while working satisfactorily for the benefit of the trade, had many obstacles to its full operation. He then referred to the need of a definition of a second grade of fruit, and would be glad to receive suggestions. After mentioning several other matters, the Minister submitted them to the meeting, stating that their decision would be a guide in framing and passing suitable legislation to further promote the interest of the trade.

Several committees having been appointed, statistics of the fruit industry in the various provinces were then presented by Mr. A. W. Peart, of Burlington, Ontario; Mr. Jack spoke for Quebec; Rev. Father A. E. Burke, for Prince Edward Island; Mr. Goodfellow, for Saskatchewan; Mr. Starr, for Nova Scotia; Mr. Manson, for Manitoba; Mr. Gilman, for New Brunswick, and Mr. Martin Burrell for British Columbia. Mr. Burrell stated that British Columbia had increased its fruit growing industry 500 per cent. in the last five years. Mr. A. W. Peart submitted an excellent report contain-

ing statistical information relating to almost all branches of the fruit industry in Canada. Considerable time was devoted to the consideration of the gathering of fruit crop reports.

Mr. Saunders, Director of Experimental Farms, gave a very interesting report on growing fruits in Manitoba and the North-west Territories. Excellent addresses were delivered by Sir Frederick Borden and Dr. James Robertson.

Two very important decisions reached were those relating to the adoption of a "fancy" grade for apples, and the defining of a No. 2 apple. The resolutions relating to crop reports, railway regulations, and the development of foreign markets were also of great importance.

The liveliest discussion of the Conference was in regard to the proposed amendments to the Fruit Marks Act. You will find a very full report of the discussions which took place in the official report, which may be obtained on application to the Department of Agriculture at Ottawa.

Many regrets were expressed that provision was not made for the conference to last at least a full week. On the whole, the gathering was a decided success.

The exhibition of fruit, flowers, honey and vegetables exhibited in Massey Hall last year was perhaps the best exhibit of Horticulture that has been held in this Province, and no better means of advertising the horticultural resources of our country than this exhibition could be devised. The number of entries were more than double the number made in the previous year, and in only one respect was this exhibition disappointing, that of the attendance of the citizens of Toronto. On this account the receipts were much less than it was hoped they would be. However, every dollar of expense connected with the exhibition was paid in full without the managing committee being required to appeal to the Government for any further financial assistance.

The exhibit of fruit was much larger than in the previous year, and the quality was much superior, and, without a doubt, it was one of the finest exhibits of fruits ever held in Canada. So numerous were the entries and so close the competition that it took the judges two days to complete their work. Special mention is due to Mr. W. T. Macoun, of the Central Experimental Farm, Ottawa, for his excellent exhibits of 115 plates of apples and 20 of grapes. The Algoma, St. Lawrence, Trenton, Lake Huron and Simcoe Stations were well represented by large collections. The Ontario Agricultural College, of Guelph, exhibited a large collection of insect and fungus diseases, weeds, apples, etc.

The County exhibits added greatly to the appearance of the show, and proved valuable from an educational standpoint, eight Counties being represented.

The results of co-operative work in Ontario, a subject which has so frequently been discussed in many of our former meetings, is one of the most encouraging signs of progress in the development of the fruit industry in our Province. The success which this year has attended the work of the various co-operative fruit growers' associations has been remarkable. Reports of these operations will no doubt be presented for your consideration during the progress of the Convention.

The special committee appointed to consider the revision of the Constitution and By-laws (see pages 108-110, Report of 1905) are submitting a report recommending many important changes for your consideration.

In conclusion, I call your attention to the program which has been prepared for this series of meetings, and express the hope that the members

may feel well repaid for any personal sacrifice they have been obliged to make in order to be present at this busy season of the year, and I also wish to congratulate you upon the excellent exhibition now in progress in Massey Hall.

COMMITTEES.

The following committees were appointed:—

Nominating Committee: Messrs. W. H. Bunting, H. H. Groff, W. M. Orr, W. H. Dempsey, G. C. Caston.

Committee on Fruit Exhibits: Messrs. W. T. Macoun, H. L. Hutt, E. Morris, W. H. Dempsey, M. Pettit.

Committee on Resolutions: Messrs. W. L. Smith, Harold Jones, H. H. Groff.

THE GUARANTEEING OF NURSERY STOCK.

The matter of securing a guarantee of nursery stock was introduced by Mr. G. A. Robertson, of St. Catharines, who stated that the grievance had been mentioned at the Dominion Conference at Ottawa, but that it was found it could be dealt with only by means of Provincial legislation, and it was thought better to leave it to the Provincial organizations to dispose of. He stated that he had, in common with many other growers, suffered serious losses by having had supplied to him trees that proved, after years of cultivation, spraying, etc., to be untrue to name. When he had ordered Elbertas, for example, there had been shipped him a white fleshed peach that would not ripen before snowfall. He was of opinion that buyers of nursery stock should also have assurance that the scions had been obtained from producing trees, and as to where the seeds used for raising the stock had been procured, that is to say, whether they came from healthy stock or from the canning factory.

Mr. W. W. Farley stated that what was called for was pedigreed stock.

Mr. Robertson: I am certainly an advocate of so-called pedigreed stock, but unless the growers are first educated in regard to it and demand it, the nurserymen will never offer it to us.

Mr. Caston: So far as apples are concerned, my advice to growers is to pedigree stock themselves. This may be done by first selecting suitable varieties for stock and then topgrafting from the best trees in the neighborhood.

Mr. Harold Jones stated that while in his opinion it might be practicable to obtain legislation requiring nurserymen to guarantee stock true to name, he did not see how it would be possible to provide for a guarantee as to the quality of the root stock or the scions.

Mr. Orr: We could not control trees received from the United States and I doubt very much whether we could control our own nurserymen. I think that if our people would support our own nurseries they would get better stock, as we have many good reliable men in the business. If we had done so in the past, we might have avoided the greatest curse in the way of insect pests that has ever visited this country, namely, the San José scale. Of the grapes I have planted I do not know that I ever had a vine that was not true to name. The apples have been true to name. In peaches there are perhaps one to two dozen trees among those I have brought to bearing that are not. If we go to responsible nurserymen, we can now pretty well depend on our stock. If we buy from peddlers, we must expect to be taken

in. I should be very glad indeed if nurserymen could fully guarantee their stock. They do guarantee it now; that is to say, they guarantee to replace it if it is not true to name. Of course it is a great loss to the grower in the meantime, but I do not see how we could obtain any further redress.

Mr. M. PETTIT: An explanation as to how the mistakes occur to which Mr. Robertson refers. I was in a nursery some years ago and remember seeing the owner filling an order from a block of Baldwin apples from which he was selecting all sorts of varieties.

Mr. PEART: As a fruit grower I can see the difficulties of the nurseryman if asked to guarantee absolutely that every tree he turns out is true to name. With thousands and tens of thousands of young trees he cannot personally supervise every one of them, and it is unavoidable that sometimes there should be mistakes. I have bought a good many thousands of trees, and not more than five per cent. have been untrue to name. If the nurserymen will replace the varieties that are not true or will topgraft them or replace them in some way, I think it is all they can be expected to do.

Mr. RICKARD: I have been in touch with a great deal of planting of apple trees, and I think there is practically no loss from these trees not being true to name; but while they are true to name, they may be wrong in every other way.

A MEMBER: In my part of the country it makes comparatively little difference as regards apple trees whether they are true to name or not, as they can be topgrafted very early from some other variety in the orchard. As regards peaches, the grower has little trouble in growing his own young trees and getting his buds from trees that are of known character. By this means he can tell exactly what strain he is budding from.

Mr. CASTON: There can be no doubt that jobbers impose a great deal on the public, and have been the cause of great financial loss. At the same time reputable nurserymen may generally be relied upon in this matter. Our object should be to regulate the jobbers and other irresponsible parties. Nearly everything I have got in a commercial way from nurserymen has been true to name, and I have no fault to find with them personally.

Mr. HILBORN: I have had a lot of experience in buying peach trees, and, on the whole, the American stock we have bought has been more satisfactory than that purchased in Canada. There has been a great deal of damage done in the western district through the sale of spurious and weak stock, and a law to control this matter would be desirable.

Mr. W. L. SMITH stated that he had been over the whole of Ontario within the last few years, and that in almost every community where fruit growing is carried on he had heard complaints about trees not being true to name, all of which did not come from irresponsible agents. He mentioned a case in South Simcoe where about one-fifth of the trees obtained from one of the largest nurseries in Canada proved wholly valueless. Where such cases occur, he thought that a reasonable penalty should be imposed, just as a reasonable penalty is imposed on growers when their fruit does not prove true to the description on the label. To require nurserymen, in the event of stock not being true to name, to topgraft it, was an insufficient remedy. Five to eight years would pass before the evil was discovered and then to topgraft or to offer another lot of young trees as an equivalent was altogether out of proportion to the damage and loss sustained by the grower.

Mr. ARMSTRONG: I have been a great loser on account of spurious nursery stock bought from reliable Canadian growers and from the best firms in Ontario, and I regard the question as a very serious one.

Q.—Did you buy your trees directly from the nursery or from jobbers?

A.—Directly from the nursery.

A Member: Jobbers often change the name to suit the purchaser.

Mr. L. A. Hamilton: Four years ago I began planting trees, and was altogether unfamiliar with the fruit business. The result was that I went to one of the best men in the country and explained what I wanted, telling him that I wanted the best stock he could give me, in fact I placed myself entirely in his hands. When the trees came and were planted, my man stated that they were very poor stock indeed, being twisted, gnarled and poorly grown. It is too early yet to see whether they will prove true to name or not, but I shall be agreeably disappointed if they do.

On the motion of Mr. Robertson, seconded by Mr. Armstrong, the following committee was appointed to investigate and report upon the proper production of nursery stock from healthy stock of bearing quality and true to name: Messrs. Macoun, Robertson, Orr, Jones, J. L. Hilborn, Farley and Johnson.

Report of Committee.

Later the following report was presented:—

Your committee appointed at the morning session of the Ontario Fruit Growers' Association held at Toronto on Wednesday, November 6th, 1906, beg leave to report that:—

1. It is a fact that much of the nursery stock planted in years past has been of inferior quality and untrue to name, and as a result the growers who planted such stock have suffered in many cases severe financial loss as well as great inconvenience.

2. That a considerable quantity of the stock which has proved untrue to name, has been purchased from irresponsible agents and unreliable firms, but that the self-styled reliable nurserymen are not all exempt from this practice.

3. That much of the blame and dissatisfaction caused has been shouldered on the nurserymen situated in the United States, but that geographical situation is not wholly accountable for this, as there are reliable as well as unreliable nurserymen in the United States as in Canada.

4. That trees be produced true to name and sold to these growers who desire such trees under a written guarantee, and that this guarantee means that the nurserymen be held responsible if trees are not up to the guaranteed standard.

5. That the nurserymen may supply to those who desire them, trees which, on account of their cheapness or first cost, will satisfy the demands of intending purchasers, but that for the quality of which, as now, the nurserymen will not be held responsible.

6. That in the case of a dispute between any grower and nurseryman, if action be taken, the matter be settled in the court nearest the home of the fruit grower so wronged.

7. That the matter of propagation of nursery stock from the proper root stock, budded or grafted with buds or scions from healthy trees of good bearing quality of the true type of the variety, be left at present in abeyance, and that this association procure a competent speaker from the United States or elsewhere to give an illustrated lecture on this subject at our next annual convention, and that we use every effort in the endeavour to inform the fruit growers of the advisability of such a method of propagation which will in time create a demand which the up-to-date nurseryman will supply.

NEW VARIETIES.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

Comparatively few new fruits have been sent to us this year for examination. But we have been doing more work than usual at Guelph in the way of originating new varieties. Many of these fruited for the first time during the past season.

We have at Guelph 120 seedling strawberries which are crosses of some of our best varieties. Among them we have some very promising new kinds coming on. I shall not refer to any of them at the present time, however, as we desire to give them a few years' trial before introducing them as something new. We also have some promising raspberries.

Some time ago we obtained scions from an English apple of high reputation in the Old Country, known as Cox's Orange Pippin. These were topgrafted on a young Tolman tree. The tree bears heavily; the fruit is handsome and of exceptionally high color, but it is subject to spot.

Q.—What is its season?

A.—Fall or early winter.

Q.—Are your topgrafts healthy at Guelph?

A.—Very, the tree is strong and vigorous. I do not think that this apple will do well in the northern parts of the Province, but it will be all right in the southern part.

Q.—Is it subject to spot in England?

A.—I do not know as to that.

Q.—It is a very slow grower, is it not?

A.—It is a slow grower.

Another variety of apple to which our attention has been called is the Minkler, which originated in the State of Illinois. The tree is hardy, vigorous, and productive. It is a long keeper, keeping with the Stark, and of good size and color.

A Member: That is one of the varieties that Mr. Huggard, Whitby, has been recommending for some time.

Prof. Hutt: Yes, and I think it is an apple that is well worth our further testing.

Q.—Have you tested the Spencer Seedless?

A.—Our committee has not yet had an opportunity of reporting upon it. However, until our Experiment Stations have a chance of thoroughly testing it, I think growers should go very slow in planting it.

Mr. Groff: I think it is in the interests of the orchardists that this variety should be investigated by this Association in its corporate capacity so that the less informed public may not be misled concerning it.

Mr. Macoun: I had an opportunity of testing this apple yesterday afternoon. I ate one specimen, and the quality was between that of Baldwin and Ben Davis, but the apple was in a somewhat over-ripe condition. It is rather attractive in appearance. The calyx is very open, however, and you can see almost to the centre of the apple from that end. On cutting the apple open, you find a slight mildew-like appearance along this tube, which gives a very unattractive appearance to the inside of the fruit. The fruit is not altogether coreless, although I did not see any seeds. Judging from reports of reliable men in the United States, I would not recommend anyone in this country to plant trees of this variety, because I do not think it will have any commercial importance here.

Mr. A. D. Harkness, Iroquois: There have been seedless apple trees growing in my county for several years, and they are now of large size; one

of them would not stand in this room. They bear a very light crop, however. The description is similar to what Mr. Macoun has given, except as to color. The quality is a little more acid, and they are also more juicy than the Ben Davis, but otherwise they are no better. The trees I refer to are large enough to bear from two to three barrels a year, but if the owner gets half-a-dozen or a dozen apples from each of them he thinks he is getting quite a crop.

Q:—Where did he get the trees?

A.—He bought the trees from an agent as seedless apples, and the conclusion he has come to is that they are absolutely seedless.

Mr. Macoun: This apple was first brought to the attention of this association by the late Mr. Whitney, of Iroquois, five or six years ago. I visited Mr. Cameron's orchard two years ago, to which the last speaker referred, and Mr. Harkness sent me flowers from this tree. The tree bears flowers such as are attributed to the Spencer, that is to say, there are no petals and it is necessary for some other tree to pollinate the apple in order to grow fruit. This may be the reason for the failure of this tree to bear.

Mr. W. L. Smith: It seems to me that if this association has any purpose at all, it is to protect the innocent grower, and I would recommend that we should have a special report on this apple.

Mr. Macoun: *The Canadian Farm and Home* quotes the following opinion of Prof. Van Deman, formerly Pomologist to the United States Government:—

Prof. H. E. Van Deman writes to the *California Fruit Grower* that any statement to the effect that the man Spencer "evolved" the "seedless' apple by a mysterious process after years of careful experimenting, is "a lie, pure and simple." The truth of the matter is, according to Prof. Van Deman, that Chas. Waters, a brother-in-law of Spencer, got scions of the variety from Virginia in the fifties and propagated trees from them in Wisconsin, but concluded that the trees were too tender for that part of the country. He moved to White Salmon, Wash., in 1884, but had sent scions of the variety to his son-in-law, A. H. Jewett, in 1879, and when the trees bore, the fruit was so poor that nearly all the trees were at once dug up and destroyed. Waters went to Grand Junction, Colo., in 1890, and took with him some of this "Waters' Seedless Apple," as he called it, and gave them to John F. Spencer. That is where Spencer got the stock for the wonderful new discovery which he is advertising as a revolution in apple growing. Waters states that he knows that Spencer propagated trees from the scions he gave him, for he stayed there several years and saw it done. The original Spencer Seedless Apple Co. claims to have 17 sub-companies. Prof. Van Deman writes that an attempt is being made to have the post office department issue a fraud order against them.—*Country Gentleman.*

Mr. Groff: The fact that this apple has been termed seedless creates the erroneous impression that it is also coreless. To my mind it is a matter of secondary consideration as to whether the apple is seedless or not, but from a commercial point of view it is desirable that it should be coreless.

Mr. Caston: It does not appear to me that it matters whether the apple has seeds or not. It lacks quality, and if it has not quality it is no good. The public looks to this association for information of this kind. $2.50 is a pretty high price to pay for an apple tree, which, I undertand is the price asked for the Spencer Seedless, and we do not want to spend money on a humbug.

It was resolved on the motion of Mr. Murray Pettit, seconded by Mr. Dempsey, that Messrs. Groff, Macoun, Morris, Johnson and Dempsey be appointed a committee to report on the variety to the meeting.

REPORT OF NEW FRUITS COMMITTEE.

By W. T. Macoun, C. E. F., Ottawa.

There were fewer good, new fruits brought to our notice this year than usual, but some interesting and promising seedlings have fruited at the Central Experimental Farm, most of them for the first time.

The cry from the colder parts of the Province of Ontario for a winter apple of high quality and fine appearance must still go unsatisfied, but we believe that it will not now be long before we shall have an apple which will fill this long felt want. The extremely severe winter of 1903-4 killed out many varieties of apples at Ottawa, but the lessons learned from that winter have been of the utmost value, and should save many thousands of dollars to those who are planning to plant apple trees in those parts of the country where the climate is similar to what it is in Ottawa. One of the facts which was brought especially to our notice after that winter was that it was the trees of varieties which ripened their wood early which came through in the best condition. An early ripening tree means, in our experience, a tree which ripens its fruit early, hence most of the hardy varieties prove to be summer and fall sorts. But there are exceptions, and we have found that in some cases the trees mature early and the fruit is in condition for eating in late fall or early winter, yet the fruit will keep practically all winter. In other words, the texture of some apples does not break down as soon as others, even though they become fit to eat at the same time.

It is this early maturing but long keeping apple which will give us the tree hardy enough to withstand a test winter. Some winter varieties of this character which withstood the test winter at Ottawa are Winter Rose, Stone, Calumet, Scott Winter, Milwaukee, La Victoire and Baxter. None of these apples, however, are quite what is desired. The Winter Rose is an apple of good size, of fair appearance and good quality, but has not sufficient acidity for a winter apple. The Stone is of much the same character. The Calumet is an attractive looking apple, but not even enough in size nor quite good enough in quality. The Scott Winter is too small, and is not good enough in quality. The La Victoire comes nearest being an apple of the desired type, but lacks juiciness. The Baxter is a very large, handsome apple, but somewhat coarse. Since the winter of 1904, however, when it proved so hardy, we consider it a desirable apple for planting in the North. All of these varieties were originated in the North.

As was stated here last year, we have at Ottawa a collection of very promising seedlings which have been sent in by persons who have originated them. As these are being tested as standard trees rather than top grafts, they are longer coming into bearing, but our own seedlings, raised from the best apples fruited at Ottawa, are now fruiting in considerable numbers. Out of eighty-four which we have described, consisting of seedlings of Fameuse, McIntosh, Swayzie, Wealthy, Scott Winter, Winter St. Lawrence, and Dorkham Russet, twenty-one have been considered sufficiently promising to propagate for further trial, so that if this proportion, which is 25 per cent., of promising apples is maintained through the 2,000 apple seedlings which are being grown we should have about 500 promising varieties to select from. In addition to these, a number of promising crosses have fruited, and many Russian seedlings also. There is a temptation to disseminate some of the best of these, but we believe that even though it takes a long time it is best

to thoroughly test a variety before recommending it, as there are too many kinds on the market already.

It is interesting to note among the seedlings which have fruited the more or less resemblance in most cases to the female parent and to the probable male parent or the tree growing near that from which the fruit was taken in the orchard. This is particularly the case in regard to the seedlings of Wealthy and Swayzie Pomme Grise. Near the original tree of Swayzie is a tree of Baxter. The large size of the Swayzie seedlings and the large dots on the skins show the Baxter blood, and in one instance a large Swayzie seedling looked very much like Baxter in outward appearance. The Wealthy seedlings nearly all have that smooth, symmetrical surface peculiar to the parent, and in some instances the seedlings have been quite crablike, showing the crab origin of the Wealthy, as claimed by Peter Gideon, the originator of it.

Some good grape seedlings fruited this year, the seedlings of Brighton being particularly promising. One of these, a black seedling, almost identical with Brighton in flavor, but a finer grape, will, we believe, be an acquisition.

There are two new apples which have been fruiting at Ottawa for several years which we would like to draw your attention to. These are the Walter and the Hoadly. They are both about the season of Wealthy, but have proved very hardy and have merits of their own.

Walter: Originated by the late P. C. Dempsey. Fruit roundish, rather irregular; very large; cavity deep, medium width; stem short, moderately stout; basin deep, medium to open, almost smooth to moderately wrinkled; calyx open; color greenish yellow, splashed and streaked with red; dots few, small, white, distinct; skin moderately thick, moderately tender; core small; flesh yellow, rather coarse, juicy, melting, subacid; flavor pleasant, high; quality good; season October.

Hoadly: Originated in Wisconsin. Fruit oblate; size above medium; cavity deep, moderately open, slightly russeted; stem short, slender; basin medium depth and width, almost smooth to slightly wrinkled; calyx open; color yellow, splashed and streaked with carmine; dots few, yellow, indistinct; skin thick, moderately tender; flesh yellowish with traces of red, juicy, rather tender, briskly subacid; pleasant flavor; core medium; quality above medium; season October. Tree an upright grower, hardy and productive. Scions obtained from the late J. L. Budd, Ames, Iowa, U. S.

Mr. Morris: The object of this committee is to report on fruits that are considered worth disseminating. I had many seedlings sent me last season in the course of my business, particularly in peaches. Some were really good, but they came at a season of the year so close to others, or they were so similar, that I did not think there was any place for them. I never yet received a specimen of an apple, unless it was Laxelle, that I considered worthy of a place in an orchard. I think that Laxelle will be a valuable apple in the north. With regard to Cox's Orange, we hardly consider it a valuable apple in a commercial way except for near-by markets. If picked when ripe it would spoil by the time it reached the English market. It does not spot with us. The Mingley scarcely colors with us, and I do not think it would color in northern sections.

Mr. Groff: I should like to take emphatic exception to Mr. Macoun's remarks in regard to the desirability of any chance work in plant breeding as compared with the more modern, efficient and scientific process of selection. My experience in my line of breeding enables me to see that it is applicable to every branch of plant breeding. The only way whereby we can hope to progress to any length and lay a foundation of more valuable

material on which to work is by the scientific selection of the parents which we cross. By the chance method suggested by Mr. Macoun, it is impossible to keep an absolute record of such crosses. It is not desirable, for the reason that in cross-breeding it is not possible to produce identical results by the repetition of the same crosses.

Mr. Morris: With regard to the production of new varieties, and the methods followed by Mr. Burbank, I do not know of a single new fruit produced by him that equals the old established kinds. He has produced numberless varieties and crosses from Japanese plums, but not one is equal to the two kinds that came originally from Japan. My advice is this: If you have an odd apple tree away from the rest of the orchard, graft two or three kinds on that tree, and when they begin to bear, plant the seeds from them. It is a simple and easy method. Get a strong, hardy kind as a foundation, such as McIntosh, Baldwin, or Baxter, so as to give the tree strength and constitution. The seedlings from an isolated tree will either come true to name, or else they will represent crosses of the different varieties grafted on the tree.

Mr. Groff: This will not prevent the reversion of seedlings to the original type. The proper condition of control can only be arrived at by many crosses and proper selection for many generations. When you get your material in a condition of control there is no difficulty in securing any quality you may desire by breeding from the proper parents—flavor, texture, color, size, early or late season—these things are absolutely under the control of the hybridist. Further than that, the results of this work, carried on extensively—I speak of the result of over half a million of offspring bred in this selected way—is beyond the grasp of the human mind. Progress has been so marked as to warrant me is saying that this is the proper method of producing new varieties. Mr. Burbank's failures have been because he did not specialize. He has done too much superficial work.

Mr. Macoun: I agree with Mr. Groff perfectly that, under his conditions, better results will be gained from intensive work. In the case of the apple, where it takes so many years before a variety can be properly tested, I think we should carry on a certain amount of this rough and ready work, while other more scientific lines are being followed. I agree that under Mr. Groff's method, results may be controlled, but in dealing with tree fruits like the apple, we have to wait a long time before we know what the result is, whereas, Mr. Groff in his work obtains results in one season. I may say that at Ottawa we are getting good results from the method I have suggested—that is to say, twenty-five per cent. of our chance seedlings are sufficiently promising to warrant us in retaining the trees. I think we can get a larger proportion of good results in this way, in the line mentioned, than by any other method.

THE SPENCER SEEDLESS APPLE.

Your committee appointed to examine into the claims made for the Spencer Seedless Apple, beg leave to report as follows:

We secured specimens from the exhibit at Massey Hall which showed the following objectionable characteristics in apparent contradiction to the printed description:

Although the core is smaller and less distinct than in the average apple, there is still sufficient to make the process of coring a necessity.

The practical absence of the calyx tube leaves an abnormally large and deep opening reaching to the core, thereby involving loss of flesh nearly equal to a normal core, as well as affording a harbor for injurious insect pests.

The specimens examined by us showed this space to contain an objectionable mould-like accumulation. They also gave well developed seeds, though fewer than the normal apple.

As to size, the specimens seen by us were about equal to our Fameuse or Snow, and those tested for quality and flavor were about equal to the Ben Davis.

We believe that our inspection warrants the advice that the trees of this apple should be purchased only as a curiosity.

The local representative of the company, who was present, said: I have been accorded the courtesy of making a few remarks in reference to the report brought in by your Committee on the Spencer Seedless Apple. The firm that is interested in handling this apple in Ontario has made an exhibit of this entirely new and distinct variety of fruit at the Horticultural Exhibition here in order to give the public fully and frankly all the information there is to be had bearing on the matter. I understand that your committee submitted its report to this association this morning. I have not had an opportunity of examining it except what has appeared in the Toronto *Daily Star* in reference to it. To the statements appearing in the press, we desire to take a few exceptions, based on the lack of information at the disposal of your committee. We are informed that the committee called at the exhibit, but that they did not make themselves known, and consequently some explanations which they should have had were not given them.

First, it is stated that "although the core is smaller and less distinct than in the average apple, there is still sufficient to make the process of coring a necessity."

On this point I desire to say that the function of a core is to protect the seed. The Spencer seedless apple being without seed, there is no longer this function for the core to perform. For that reason the core is not developed, but the cells are thin and paper-like, and by a process of nature are taken up by absorption. By the time the fruit is ready for eating, which is about the month of March, the presence of the core is no longer evident, After producing the first seedless apple, Mr. Spencer continued his experiments and by a process of careful selection, budding and grafting was able to produce an apple that eliminates the necessity for a core, and at the time the fruit is ready for consumption the core has disappeared.

"The practical absence of the calyx tube leaves an abnormally large and deep opening reaching to the core, involving loss of flesh and affording a harbor for insect pests. The specimens examined showed this space to contain an objectionable mould-like accumulation. They also gave well developed seeds, though fewer than the normal apple."

In regard to this matter I have only to say that the same process of careful selection in budding and grafting that I referred to above, has enabled Mr. Spencer to produce in his last generation of tree an apple that is no more open in this respect than is an ordinary apple. The fruit specimens from this last generation of trees are limited on account of the trees not being in full bearing. The supply of fruit for this exhibition came from the home orchard at Grand Junction, Colorado, and most of the apples were from the older trees, but we also have some of the more recently developed specimens,

which we are ready and anxious to show to anyone visiting the exhibit. In these specimens the calyx is so nearly closed that it is very little different from the ordinary apple.

To allay any supicion of fraud, and to assure the public of our genuineness, we have taken this opportunity of exhibiting the fruit in order that they may see the merits of the apple. We freely cut the apple open before the public and give them an opportunity of tasting it. The unanimous opinion is that the apple compares with the Baldwin in quality and texture. It is also a splendid keeper.

With reference to its seedless character, I may say that out of one hundred specimens cut, we found but one seed. In this respect the apple is very similar to the seedless orange, in which fruit you will come across an occasional seed also. The reason for this is that where the branches of these trees interlace with those of seed-bearing apples you will occasionally find that a seedless specimen has been fertilized by a seed-bearing variety, and on that account we occasionally find a seed present.

Hon. John Dryden made a trip to investigate this apple and the business methods of the parent company. His integrity no one can question. He made a full and unprejudiced report, and it is worthy the attention and consideration of every fruit grower in the Dominion. I may say further that the company operating in this country has no connection whatever with the parent company, except that it has obtained the right to grow these trees here.

Mr. Groff: As chairman of the committee, I should much prefer that the whole report be read in order that the description of the apple as we found it may be thoroughly understood by those present. There is no intention on our part to say anything that is unfair to the concern handling the Spencer seedless apple. At the same time it is the proper thing that we should report both as a committee and as an association exactly what we believe the facts of the case to be.

This gentleman states that he has found a very limited number of seeds in the apple. Our committee found three seeds in two apples.

After the report had been read by the secretary, the representative of the Spencer Company stated as follows: "We do not contend that the apple is absolutely devoid of seeds at all times, for the reasons I have already given, but we claim that we have an apple the nature of which is to be seedless, and if not contaminated from outside influence, a seedless fruit will be developed."

THE DOMINION CONFERENCE OF FRUIT GROWERS AND ITS IMMEDIATE RESULTS.

By W. H. Bunting, St. Catharines.

As one of your representatives to the Dominion Fruit Conference at Ottawa last March, I have been requested to give you a short resume of the immediate results of that gathering of representatives from the different provinces of the Dominion. It is not my intention to go into the matter in an exhaustive manner, as the proceedings of the conference have been printed, and for extended details I will refer you to that report, which will give you the addresses, and the discussion that took place. The report is well worth reading by any person who is interested in the fruit industry.

The conference was known as the Second Conference of the Fruit Growers of the Dominion. As many of you are aware, the first conference was held in the same city some sixteen years ago. I did not have the pleasure of attending it, but I believe that matters of a somewhat technical character were discussed, and it was felt then that the result of the conference was of such value that it should be continued from time to time, and an attempt was made to form a Dominion Horticultural Association. Through circumstances which were apparently unavoidable, that organization never succeeded, and until last March no similar gathering was ever held. During this interval great changes had taken place in the fruit industry in line with the progress in other branches. As fruit growers we have extended our boundaries on every side, and in almost every Province in Canada at the present time fruit growing has become an industry of importance. It was felt that, as this Dominion is very broad, and as the interests involved are very diverse as well as important, a gathering of the representatives from the different Provinces once more was not only very desirable but absolutely necessary. With this object in view, the various provincial associations have, during the past few years, been making an effort to attain this object. While I presume that the initiative came from this Association, I think I should fail in my duty if I did not refer to the indefatigable efforts of our modest Chief of the Fruit Division, Mr. McNeill, who was untiring in his endeavor to bring about this conference, and who did so much in the work of organization to further its success. In fact if Mr. McNeill had done nothing else since his appointment as Chief of the Fruit Division (and I think we must all admit that his works are legion), the very fact of the assembling of this conference particularly under his auspices, is a sufficient apology for his existence as administrative officer in the Fruit Division.

The keynote of the conference was a desire on the part of the representatives to get together and compromise as much as possible conflicting ideas and diverse opinions upon subjects likely to be discussed. In this connection Hon. Mr. Fisher in his opening remarks made use of some expressions which I think I shall do well to repeat to you as striking the keynote of the deliberations of the entire conference. He said in part as follows:

"This conference is essentially of a national or of a Dominion character, In every Province of the Dominion where fruit growing is practised, and that means nearly all our Provinces, there are provincial organizations which deal with the conditions and circumstances of the individual Provinces as they effect fruit production. These associations are in existence everywhere, But we have to-day in our fruit industry problems which are international in their character and which overlap from one Province to another, and have to be dealt with on a national basis. It is particularly to this class of problems that I wish to direct the attention of the conference. We have, as you have noted in the list of delegates, representatives from the Maritime Provinces at one extreme, and from British Columbia at the other. Interests are diverse in these different localities, and there may be differences of opinion, but we must try to harmonize these differences, and I trust and believe that you will succeed in doing so. We have had many instances of apparent difficulties in this Dominion, but on frank and free discussion they have disappeared, and we have been able to reach a national expression, embodying the best interests of the country. The previous conference attained that end, and we shall accomplish great good for the Dominion by following in their footsteps."

In giving expression to these remarks, as I said, Mr. Fisher struck the keynote for the deliberation of the conference. While at times there arose

matters which seemed to be of a controversial nature, I failed to hear at any time a note of discord or anything that would appear in any way as bitter or narrow in connection with these discussions. In a letter to me a short time ago in proof of this fact, Mr. McNeill stated as follows:—

"One of the most important results was the breaking down of sectional feeling, which is bound to exist between Provinces so widely scattered as those of the Dominion. Nothing could be more marked than the amelioration of long-standing frictions. In this connection the conference may be said to have risen to the dignity of a nation-builder inasmuch as without this sentiment political union would be of little value."

To come now to the results of the conference, it is my desire merely to touch upon three or four of the salient features, leaving my colleague to fill in or to elaborate as he may see fit.

The first item of importance brought up was an exhaustive treatise by Mr. Peart on the statistics of the fruit industry. I may say that I was somewhat curious to learn just what Mr. Peart would be able to make of that subject, owing to the difficulty we have in Canada of securing reliable and accurate statistics in reference to the industry. While statistics have been compiled giving data of a certain character, we have felt that we were lacking in a systematic method of securing data for statistical purposes. In coming before any body of business men and presenting to them the importance and value of the industry, we have been at a loss to secure accurate information in this respect. I was very much surprised indeed that Mr. Peart had been able to secure the data he presented. It was exhaustive so far as it could be, and extremely valuable, but it only went to show the necessity of some system, both Dominion and Provincial, whereby accurate information could be obtained. I think that as an association, we should press for that work being forwarded in our own Province, which is the banner fruit growing province of the Dominion.

The next important matter was a discussion of the Fruit Marks Act. This Act was brought into force largely at the request of this Association, for the reason that complaints had appeared from time to time in reference to the condition of our fruit in foreign lands. The measure has given very much satisfaction and has proved beneficial to the trade generally, as you know. It possessed, however, some weaknesses which it was felt should be remedied. The Minister of Agriculture was anxious that this should be done, but was waiting for some pronouncement from those interested. One of the most serious difficulties was the question of the No. 2 grade. Fruit growers had talked it over from all sides. It had been taken up and laid down, and it seemed to be a very difficult matter to arrive at a definition that would meet with the approval of all concerned. A definition has now been arrived at. While no doubt it will not meet with the approval of every individual, still it met with the approval of the conference and has been accepted by the Government and become part of the law. I am pleased to learn from undoubted authority that the working out of the decision has already proved beneficial, and that whereas up to this year the No. 2 apple was anything at all, it is already taking its place as a commercial product with a definite known value. As the definition becomes better known and as packers and growers educate themselves to the conditions involved, I have no doubt that the No. 2 apples will take a place very little inferior in price to No. 1. The No. 3 grade will then cover a larger portion of the balance of commercial apples, which at the present time is allowed to go to waste in the orchards, or is passed off as No. 2.

Another grade is named "Fancy" to meet the wishes of our British Columbia friends, and also of those growers who are practising improved methods, and who desire to put upon the market something strictly fancy. While we from Ontario and Nova Scotia are objecting to the very strict definition of this grade, which is such as to be almost unattainable, I understand that a certain amount of elasticity is to be allowed in practice when accepting the definition. These were two of the principal points in connection with the Fruit Marks Act that were provided for, and I certainly believe that the near future will show that the legislation in that respect has been wise.

Another subject of great importance to the fruit growers was the adulteration of fruit products. It was shown that to some extent the preparation of fruit products in this Province was not absolutely free from suspicion, and representations were made to the Dominion looking to the placing of safeguards around the preparation of fruits, so that substitutes could not be placed upon the market.

Another point on which it was expected that there would be considerable controversy and probably great difficulty in arriving at a satisfactory conclusion was the question of packages. It has been felt that uniformity was extremely desirable in baskets, boxes and barrels so that no matter from what province they might come, not only would the quality be definite, but the quantity would be definitely and well known. With this in view, efforts were made to regulate the size of the barrel, box and basket to be used. While the question of packages was not finally disposed of, considerable progress was made. The 28 1-2 in. barrel was approved by all present, as was the standard box, 10 x 11 x 20. Some details with reference to one or two sizes of baskets in use in certain sections were not definitely decided, but I desire to say that they are on a fair way of being disposed of, and I understand there has been greater uniformity in connection with baskets this year than ever before. Had it not been for unfortunate circumstances in connection with one or two of our factories in this Province, I think perhaps our baskets would have been almost uniform this year.

The question of transportation has always been a live one with commercial fruit growers. It was taken up and discussed from various standpoints in reference to the express business, the freight service and carriage by water. A great deal of valuable information was brought out and a series of resolutions were brought forward and heartily endorsed, and if the fruit growers of the Dominion are able to succeed in having them made operative, it will result in very great improvement in transportation. We have encountered many difficulties in that respect during the past few years, but we are hoping for better things in the future.

One of the items to which I should direct your attention was the effort on the part of the conference to have the express companies placed under the control of the Railway Commission. When the new Railway Act was passed, and a Board of Commissioners appointed, the express companies by some means escaped being placed under the control of that Board, and it was felt that this was a serious oversight. A committee from the conference waited on the Premier and his colleagues and made a strong effort to have the express companies placed under the control of the Commission, and, as you are no doubt aware, legislation was passed, although at the interview Sir Wilfrid did not give us very much encouragement that he would bring down anything in the way of an amendment owing to the lateness of the session and the pressure of work. However, the representations were so well put and considered so strong that during the session, legislation was brought

in and passed which placed the express companies under the control of the Commission. It now remains for the fruit growers who feel that there are grievances in this connection which should be redressed, to prepare their case and present it before the Commission, feeling assured that they will get an impartial hearing and that justice will be meted out where it is required. A strong committee representing the various provinces was formed with the object of aiding and promoting, from the standpoint of the whole Dominion, facilities for the moving of our fruit to the centres of distribution and placing them in the hands of the consumer in a more satisfactory condition.

Many minor matters were brought up during the two or three days of the conference and every moment seemed to be crowded with business from start to finish. The Minister of Agriculture, before the close of the conference, signified his willingness to make such arrangements as would provide for the assembling of a similar conference every two or three years, and I am sure that this Association may congratulate itself on the effort it put forth to have this conference inaugurated.

I wish to thank you for the honor you conferred upon me in appointing me as one of your representatives. I did the best I could, took part in the discussions, and endeavored to reflect the opinions of the fruit growers in the Province of Ontario as well as I was able.

THE DOMINION CONFERENCE OF FRUIT GROWERS—FUTURE POSSIBILITIES.

By A. W. Peart, Burlington.

Mr. Bunting has given you a very clear statement of the proceedings at the Dominion Fruit Conference last March, but there are two or three features which he did not touch upon to any great extent, and these I shall refer to more fully. I entirely endorse what he said in regard to the spirit shown at that conference. As the delegates were from all parts of the Dominion, there appeared to be during the first day's proceedings a certain amount of Provincial prejudice, and the delegates from each of the Provinces were somewhat inclined to group themselves together, but by the third day of the conference the delegates from different parts of the Dominion were intermingled, and this showed the spirit that prevailed. As business proceeded the feeling became more and more one of unity of purpose and spirit.

With regard to water transportation for fruit, I may say that in the Burlington district we have been in the habit, during the past eight or ten years, of sending perishable products in the shape of pears, plums, grapes, tomatoes, etc., to the Old Country, and have met with very varied success. Some shipments went through all right, while others would scarcely pay their way. We had hoped that as time went on the cold storage arrangements on board ship would become more and more complete, and I think that our experience last August—if you were to compare it with our experience three or four years ago—would certainly show that cold storage is much more reliable and more efficient than it was formerly. In August we shipped Clapp Favorite and Bartlett pears to Glasgow, and they arrived in practically the same condition as they left our orchards. We had gotten into the habit of picking our fruit rather on the green side, and did so this year, with the result that the pears were somewhat too green when they reached

their destination. We feel, therefore, that in the line of cold storage something is being done. I am one of those who think that there is a future before the tomato growers of this country in the business of exporting certain classes of tomatoes. For three seasons I tried to export them, using the variety known as Honor Bright, a firm, late-ripening variety, probably the best in quality of any that I am acquainted with. It met with varying success. One shipment reached Glasgow in good shape and sold at a very profitable price; another shipment was a little off and sold lower; another reached there in still worse condition, and I had to pay the charges. I am in hopes that some of our vegetable experts will give more attention to the production of a new variety of tomato which will be fit for export purposes. The Honor Bright is the best I know of at the present time for that purpose, but it is rather late in the Burlington district. If they could develop a medium-sized, smooth, firm, good quality tomato that would come in two weeks earlier than the one I referred to, it would form a very valuable addition to our varieties.

In regard to insect and fungus pests, this question was also dealt with by the conference. I do not know that anything of a new character was brought to the surface in the way of methods of treatment, but the methods we are already acquainted with were emphasized. I will say that the man who discovers a remedy for the codling moth will earn the personal gratitude of the fruit growers of this Province. In our district I think the moth destroys one-third of the value of the apple crop. I have tried a number of methods of treatment, among them spraying with Paris Green, and sowing the orchard with peas, then allowing the hogs to harvest the crop and incidentally eat the fallen apples, thus destroying many worms. This method is satisfactory so far as it goes, but it is not a complete remedy. I have tried bands and believe they are good if properly taken care of, but if you neglect to remove them at the proper time, you simply furnish homes for the moth and aggravate the trouble. I do not think there is any effective and satisfactory remedy yet discovered which will control the moth.

A resolution in regard to markets and marketing was passed. It was to the effect that the Dominion Government should appoint agents in various foreign countries wherever apples are sent, whose sole duty it should be to open up and exploit those markets in the interest of Canadian orchardists. The question of markets is a very important one to the apple growers of this country. The resolution was passed and it is possible that in the near future something may be done in this line.

The question that I was requested to speak upon to-day more particularly is that of fruit statistics. I think that the conference has already had some beneficial results inasmuch as according to the programme, the Deputy Minister of Agriculture has been induced to give us an address on the subject, and I am bound to say that I believe when Mr. James takes hold of the question something will result from it. I need not say that statistics in regard to the fruit industry of the Province and of the Dominion is an important question. Some years ago I did a certain amount of Institute work, and time and again I was asked by fruit men in various parts of the Province what was the value of the fruit industry, what was the average annual value of the apple crop in the Province, and questions like that. I had no data; I could not answer the questions. When Mr. McNeill asked me previous to the last conference to go into the question, I tried to do something with it. I sent for the Census Report for 1901 and the Dominion Trade Reports, and delved into those figures for a month or so and tried to evolve something that might be useful to the conference. I found that in the 1901 Census Report:

(1) The values of the fruit and vegetable crops are lumped at $12,994,900.

(2) That in connection with the number of trees, there are separate columns for apple, pear, plum, peach, cherries and for "other tree fruits," bearing and not bearing by counties, provinces and Dominion.

(3) In connection with the crop yield there are separate columns for each of the above classes by provinces, counties and Dominion.

(4) That in regard to acreage, all orchards are lumped together. The acreage in vegetables and small fruits is lumped; vineyards are given separately.

The statistics at present collected by the Province of Ontario give the following information:—

(1) Acreage of orchard and garden by counties and province;

(2) Acreage of vineyard by counties and province;

(3) Number of apple trees, fifteen years old and over, and the number under fifteen years by counties and province;

(4) Also, total crop in bushels, and average number of bushels per tree, by counties and province.

I would recommend that the Department be asked to give further details as follows:—

Acres of apple orchard. County and Province.
" pear " " "
" plum " " "
" peach " " "
" cherry " " "
" other tree fruits " "
" small fruits " "
" vineyard " "
" garden truck " "

To continue giving the number of apple trees by counties and province and also the average yield per tree.

Mr. Peart then moved the following resolution, which was seconded by Mr. Harold Jones and carried:

That the Government of Ontario be asked to publish yearly in the Report of the Bureau of Industries further details of the fruit industry of the Province.

ADDRESS.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

I have been very much interested in the discussion that has taken place here this morning on the election of directors, and I observe that this Association has to contend with the same difficulties in this connection as other similar associations meet with in other parts of the Dominion. It appears to me that it would be a good thing, both for this and other associations, if some plan could be devised for the conduct of the elections so that the time of the delegates who come so far to attend these meetings might not be occupied so long with the matter. Still I think it is a good thing that you should take an interest in this question and that there should be an intelligent selection made.

I am glad that the question of the standard size of baskets has come up in the form of a resolution. I hope that the influence of this Association,

supported by that of the basket manufacturers, may result in the desired amendment to the "Act Respecting the Packing and Sale of Certain Staple Commodities."

I am glad to observe that the co-operative movement is making some progress in Ontario in connection with the shipping and packing of apples, and other fruit. I am a strong believer in the principle. Canadians as a rule are not very favorably inclined towards co-operation. Some people say we are too independent and want to act individually. The most truly independent people I know of have made the most progress in co-operation. I refer to the Danes. Co-operation makes for true independence. I should like to ask the representatives of the Co-operative Fruit Growers' Associations whether they do not feel that they have more power and that they are in a more independent position in many ways than when they were acting individually. The spirit of co-operation is abroad, and I would only add that as far as the Department at Ottawa with which I have to do, is concerned, we are only too glad to lend our assistance and support in any way in which we are competent to give it. The extent to which people co-operate is a very good indication of the amount of progress they have made from a state of savagery. It is among savage races that we find individualism carried to the extreme. As we progress in the scale of civilization, our needs for co-operation increase. I am sure that anyone who visits Denmark and examines even casually the methods and results obtained there, cannot fail to be impressed with the importance of the question. They are the most successful agriculturists in the world to-day, and their work is done almost entirely under some form of co-operation. The Danish farmer is the best educated farmer in the world—educated in that which will help him along in his own line of work. He may not have a better literary education than many others, but he has been educated along the line of agricultural effort to such an extent that he is able to sink his individuality for the sake of the general good; that is why co-operation has been such a success in Denmark. They are loyal to their institutions; they stick to them through thick and thin because they are able to see beyond a momentary gain to the ultimate result of any particular course of action. They will not be weaned from their own institutions even though they are offered higher prices from outsiders, and this is why they have made the movement such a success.

I think there is great room in this country for the development of cold storage in connection with the handling of our fruit products. I have no very definite idea at present as to how this ought to be worked out, but I see some movements in progress that are calculated to render very great assistance to the industry. In New York State they have had great success in this direction and by this means they are able to preserve their fruit in good condition and thus avoid temporary gluts in the market.

I have been giving some attention to the question of transportation. The Middle Canadian West, which is rapidly filling up, will, in the near future, require an enormous supply of fruit. In that country where everyone must buy his fruit, the demand will be very great. It will mean a tremendous amount of traffic in handling tender fruits, and in those that can be transported more easily. I have been giving some attention to the shipments made by the St. Catharines Cold Storage Association during the past season, and may say that they have been very successful indeed, even as far west as Calgary. I am pleased to be able to state also that some successful shipments of tender fruits have been made to the Old Country this year. Transportation facilities on the ocean have been very much improved and so have the facilities for handling all kinds of perishable products on the other side. They are just waking up in Great Britain to the importance

of cold storage establishments. The success of the cold storage plant at the Surrey commercial docks is influencing the authorities at other points to take similar action, and it will not be long before you will find cold storage right on the quays at all the leading ports. These things are of great importance to fruit growers, and I believe there is a very much better chance to-day than ever before for successfully placing tender varieties of fruit on the Old Country market. Not long ago I interviewed some of the Covent Garden people and they spoke very highly of some of the peaches sent from this country. These were shipments that had received the benefit of the cold storage system I referred to.

The future seems to be full of promise for the fruit grower in the Province of Ontario. You may have difficulties to contend with, but you are beginning to handle these things in a better manner than formerly. It seems to me that what the fruit business of this country needs more than anything else is organization. Cold storage will not remove all the difficulties nor prevent all the waste that is going on. A good many people who have not thought much about it go round the country and see the vast quantities of apples lying on the ground, and come to the conclusion that if we only had cold storage the whole of this waste would be avoided; something more is required. Proper organization is necessary. Many farmers have orchards, but the orchard is only a side line. If he has a crop, he is so much ahead, but if it is a failure, he has not been depending on it. The majority of our farmers who are growing apples are not orchardists. What we need is more farmers who are orchardists, giving more special attention to their orchards so that the apple raising business may cease to be a mere side line.

FRUIT STATISTICS.

By C. C. James, Deputy Minister of Agriculture, Toronto.

Mr. Peart has called your attention to the resolution adopted at the Ottawa Fruit Conference in reference to the collection of fruit statistics, and I suppose that this resolution was intended to be the basis of anything I might have to say to you this afternoon. This is one of those questions which it is so easy to ask and so difficult to answer. One might almost say there are no fruit statistics; and anyone who undertakes the task of trying to collect them will find that he has undertaken one of the most difficult statistical propositions to which he could set himself so far as this Province is concerned. Back in 1892, when perhaps we were not so wise as we are now and dared to attempt greater things than at present, we thought we would undertake the work of collecting and tabulating fruit statistics. Some of you will probably remember that at the meeting held, I think, at Hamilton, I presented certain statistics as to the extent of orchards, the number of trees, etc. It was thought by some that these figures were grossly exaggerated, but the more they were looked into, the clearer it became that, instead of over-estimating, we had under-estimated the extent of the industry so far as the number of trees was concerned. I found later that the figures we then put out did not disagree to any great extent with the figures lately put out by the Dominion Census of 1901. For instance, in 1892 the number of bearing apple trees was stated to be 6,637,000, while the census gives the number at 7,081,000. We have found that the Dominion Census, which is a compilation got from the individual

growers, corresponds in the case of apples, pears, plums, peaches, cherries and grapes, fairly well with our figures, which are merely estimates. Our estimate, for instance, of the number of grape vines is 2,174,000, while the census places the number at 2,043,000.

We thought that having for several years estimated the number of trees and vines, it would be a comparatively easy matter to figure out the crops. We have been fairly successful in figuring out grain crops, etc., and thought it would be but a small step to extend the work to fruit. We soon discovered our mistake, however. To illustrate: Here is a man with a ten acre field of wheat. Most of you here on looking at that field would be able to make a fairly accurate estimate as to the number of bushels it would yield, and it would be the same with all other grain crops. After the wheat has been harvested, and the threshing done, and the granaries have been filled, you have a means of verifying your calculations. Everything that was grown in the wheat field is stored in the bins, and there is very little trouble in calculating with fair exactness how much wheat, oats, barley, etc., your farm has produced. If this can be done on one farm, it is simply a question of enlarging your field and you can figure out the crop production for the whole Province. On the other hand, we have here to deal with an apple orchard, and I think you will agree how difficult most of you who are not experts in that line would find it to go into that orchard towards the end of the season and estimate, within a reasonable limit, the size of the crop the orchard will produce. This is one of the reasons why the buying of fruit on the trees is condemned in so many districts, that is to say, it is for the most part very uncertain whether the producer or the buyer is going to make money on the transaction. When, therefore, we have asked farmers to give us their estimates of the fruit crops, we have frequently hesitated about publishing them. Even after we have secured an estimate of the crop on the trees, it is by no means sure how much of that will be harvested. In certain sections—not the special apple growing districts—there are immense quantities of apples which are estimated but which are never taken into the barn or fruit-house, but are allowed to fall and be consumed by the hogs or rot on the ground. For this and other reasons when we take up this question we find ourselves confronted with a serious difficulty. Another point is that fruit crops are not as evenly distributed as are the grain crop and live stock of the Province. You may think that you are setting us a very simple task when you ask us to compile these statistics, but we have found so many difficulties in the way that we hesitated about undertaking it unless we felt sure that it could be done satisfactorily. The necessity and importance of having these statistics we all fully recognize. The question is, can anything be done in this direction, or must the fruit growers depend upon the census figures which are taken every ten years. Perhaps you may say that if they can be taken every ten years at the time of the census, why cannot the Provincial Department do it every year? Some of you may have watched the discussion in the papers as to the cost of taking the last census. If so, you will understand why the Department or the Government of this Province hesitates in a matter of this kind. The cost of taking an annual census where every producer is visited would entirely preclude such a task.

Q.—Would it not be possible to use the county officials, giving them more columns to fill out in the annual assessment?

Mr. James: If you had been up against township councils and assessors for twenty years, as I have, you would know that it is almost a hopeless task. Unless you are prepared to pay them for the work, I do not see

how we could ask the assessors to obtain any further figures. Another great difficulty is this, that while we have a number of very competent assessors, there are some others who are not very competent. We are having the greatest difficulty in getting our municipal statistics, which are comparatively simple. If the assessor had to obtain, in addition to what he now procures, an exact statement of the fruit products of the previous year, I do not think we should obtain reports that would be at all satisfactory or complete.

Mr. ARMSTRONG: I am of opinion that if the assessor in every township was given to understand that he would receive say $3, which would be a small sum in the aggregate, for this work, it could be done.

Mr. JAMES: I do not think so; $3 would not begin to pay him for his services.

Mr. W. L. SMITH: It would be a simple thing for him to give the number of trees.

Mr. JAMES: We have that in the census. The question is to find out at the time the fruit man wants to know it, what there is on these trees in the shape of a crop, and also at the end of the season what has been harvested. The assessor could not very well do that. What he would get in the spring when he went his rounds, would be the production of the year previous.

Mr. ARMSTRONG: The object of the resolution is not so much a commercial one as to give the public a fair and honest statement of the extent of the fruit industry in the Province.

Mr. JAMES: I want to give you another point for consideration. I have spent much time thinking over this to see whether it would not be possible to arrive at some satisfactory figures. According to our estimates we have figured that last year there were 7,000,000 bearing apple trees in the Province, and that they produced 31,000,000 bushels. These estimates are made from the farmers' own reports. In the *Mail and Empire* of Tuesday last, you may have noticed an item under the heading of "A Heavy Apple Crop," which stated that one firm in this city estimated that the total crop would approximate 500,000 barrels, which is about 25 per cent. less than a year ago. When you run up against the fact that the actual crop marketed, as given by the wholesale fruit men, is only from 500,000 to 750,000 barrels, and you find from the farmers' statements that the trees carried from fifteen to twenty-five million bushels, you feel completely at sea about it. You come to the conclusion that if there is anything at all reliable in these figures, then the apple orchards of this Province are the most neglected and the least productive parts of our farms. If we have seven million trees producing apples, and this year there are only 500,000 barrels that are marketable, and that last year only 25 per cent. more were marketed, then the waste must be something appalling, and our apple orchards must be one of our great neglected assets.

Q.—Is the difference not due to the San Jose Scale in the southern part of Ontario?

Mr. JAMES: Damage by San Jose scale cuts a comparatively small figure so far as seven million apple trees distributed over the Province are concerned.

Mr. MACOUN: Have you ever considered the advisability of getting the school children to collect the information for the teacher? They might be given blanks to take to their homes and fill out, and the teacher could forward them to the Department.

Mr. JAMES: We have not become acquainted with any workable scheme yet except the plan we have been trying to introduce during the past two or three years. We have concluded that the only way to get the informa-

tion is to send out for it. We know very little about the special crops of the Province, and during last year and this we have been gathering some information on the subject. As a result we have several reports which we intend to publish before long. For instance, a man specially qualified has, during the past summer, been gathering information in regard to the bean crop. He has obtained information that could not have been secured by circular or by any such means. Then we have two or three other reports. We sent a man to one of the townships of East Northumberland to collect information regarding apple growing in that section. Another man has secured information in the canning sections. We have thought that if we could get a resident in each section to take charge of that section and study the crops there, reporting to us on the whole of the crops of the district from his personal observations, we should in this way get the information we require.

If any of you have any suggestions that are workable, we shall be only too glad to receive them, but you will probably find as you think over the matter and the suggestions made, that there are more or less difficulties and objections in the way. Take for instance the suggestion that the school children should do the work. This I fear would be an uncertain method, and would depend largely on the attitude of the teacher. One teacher might look after it all right, and the teacher in the next section would say "There is nothing to be gained by this; I am not paid for it at any rate, and I do not think I will do it." Then take the suggestion to pay the assessor an extra $3.00 for this work. The assessor goes to every farm house; he has to ascertain the number of apple, pear, peach and other trees, and fill in the amount of the crop produced; the farmer's wife is not in a position to give him the information and has to refer him to her husband, who is away perhaps at a distant part of the farm. When he comes, as likely as not, he cannot give the exact number of fruit trees he possesses, much less the amount of fruit they yielded during the previous season. It does not seem therefore that $3.00 would be an adequate compensation for the trouble the assessor would be put to in the matter. Then as to the suggestion regarding school teachers, I assume that $5.00 or $10.00 would not be too much to pay them for their trouble, but there are over 5,000 rural schools in the Province, which would mean a total expenditure of $25,000 to $50,000, which, I am afraid, would be altogether beyond our means.

You may be sure, however, that we are working as best we can, and if we can develop any satisfactory system, we shall be only too pleased to do so. But unless we can assure ourselves that these figures are fairly reliable, we think it far better in the interest of the fruit growers not to publish them at all. We feel that our figures in regard to crops and live stock are accurate, and we are prepared to stand by them, as we can prove them to be correct. But when it comes to fruit we have felt that we had no figures that were really reliable. I am not sure, indeed, whether it would not be advisable for us to withdraw even the apple statistics, as the figures given by the farmers themselves give us so little information as to marketable fruit.

Q.—How do you account for the difference between the farmers' and dealers' estimate of the crop?

Mr. James: In obtaining our information, we send cards directly to the farmers on which certain questions are asked. We send out from 25,000 to 50,000 cards. Say that in a given section there are 150 farmers and from 50 to 75 return to the department the cards with the answers filled in. When they reach us, they are checked over and if any palpable mistakes appear, these are thrown out. From what remains, we estimate the total apple crop.

Mr. A. H. Pettit: Could not four practical men in each county in the Province give us a comparatively accurate report after the fruit is well set upon the trees. Reports are sent throughout the country as to the prospects of the apple crop for the year, and in many cases these are inaccurate. A man sells his orchard on the strength of the report, and perhaps does so at a loss on this account. What we should like to have is, first, a report in advance of the crop, and second, a report of the total crop after it has been gathered.

Mr. James: That is to say you desire an estimate of the crop before the prices are fixed in the market.

Mr. Pettit: If it is to benefit the fruit growers.

Mr. James: If instead of depending on the individual farmer to make reports, we could afford to keep permanently employed in the different sections, men who would make it their business to collect these reports for us, I think we could get good information, but it would be an expensive method. Supposing we had a correct estimate early in the season, what would be likely to be accomplished by it?

Mr. Rickard: I do not think it would be of very much aid to a man in selling his fruit unless we knew something about other countries also, and the world's supply and demand, as these are factors which enter largely into the question of prices. It makes very little difference how many apples you have in Ontario as to what the price will be. It is such a far reaching question that unless you can present all the statistics on the subject, you have very little to go by.

Mr. W. L. Smith: You could get the reports to which Mr. Rickard refers from the American Consular Reports and through the commercial agents in Great Britain.

Mr. James: One hesitates sometimes about accepting some of them unless we know that their source of information is considerably better than the one upon which we are forced to depend.

Mr. Smith: I have watched these reports rather carefully for the last four or five years and as a rule have found them to be fairly accurate.

Mr. Jones: I think that if two or more men in each district could make an estimate of the fruit in the orchards, it would give you something of value.

Mr. Caston: I do not think you will get any better system than the one employed already. There are practically only two railway systems shipping apples in this country. From them we might get a statement of the shipments to the Northwest and abroad, so far as apples are concerned. But there is no single product of the farm that is so largely consumed locally as the apple crop. We have six incorporated towns for example in the county of Simcoe. These people consume a large quantity of apples, and they are supplied by the farmers direct. The shippers' estimate to which Mr. James refers of course takes no account whatever of the fruit required to supply this demand all over the province, and this I think goes a long way to explaining the apparent discrepancy.

Mr. Bunting: I think we appreciate the difficulties under which the Department is laboring, and their desire to procure the information required. It seems to me that the first thing is to get accurate information as to the number of trees of the different varieties of fruit in each county. That could be provided by the method suggested, that is to say, through the assessor's list, if the question of compensation could be arranged. As to the obtaining of the aggregate output during the fruit season, that could be provided for by appointing two or three men in each county to estimate the crop. I should like to call the attention of the meeting to the fact that

we have here a gentleman from New York State Experiment Station, and that they have instituted an apple survey whereby they arrive at an estimate of the crop.

Prof. PARROTT: In New York State, Cornell University instituted a survey in three of the leading apple sections, but in no case have they made an endeavor to get all the data necessary for the entire county. They simply take different districts that are representative of the county. This work has been done entirely from the standpoint of getting the actual number of trees and the amount of the crop produced, the idea being to determine what varieties have proven most remunerative, what pests are most destructive, and also the relative profit from apple trees grown in sod and otherwise. In Walters township, Wayne County, they have actually visited every orchard and obtained the number of trees in each, including apples, pears, cherries, plums and quinces. They have also endeavored to get the ages of the trees, the number of varieties, and the value of the fruit yields for the last five years. I have some doubt as to the value of the data thus given as to crop yields, as at best it is only an approximation. Take the case of our San Jose scale work, in connection with which we leased eight of our experimental orchards. We found it almost impossible to get the fruit yields for two or three years back.

We are undertaking to make another survey in which we are soliciting the co-operation of the orchardists in Ontario County, the one in which the experimental station is located. This fall we formed our organization, and I think it is going to be one of the banner apple associations in the State. An exceedingly large percentage of the growers attended the first meeting. From the members of the organization we are going to try to get the data we want. Each man will visit the orchards in his community of those who are not members of the association, and will fill out blanks as to the number of trees, the varieties of fruit, ages, pests and crop yields.

I think the value of the reports to the state regarding yields, does not amount to much so far as the marketing of fruit is concerned, unless there is very close co-operation with all the other States of the Union. It does not help the apple growers of New York to know what their fruit crop is, unless they know what has been produced in the other States as well. Before the reports have any great value in aiding the marketing of the crop, it is necessary that there should be close co-operation with other states. During the past summer it was reported in New York State that there was only 60 per cent. of a crop. Farmers were advised to hang on to their fruit, and reports were spread that in other states the crop was small. As a matter of fact I have information that in Missouri, Iowa, Illinois, and some other states in the central district, the crop is an unusually large one.

Mr. RICKARD: I think that the most effectual way of getting at the number of trees would be through the assessors or through the local municipal government. If you have an apple-growing municipality like the township of Clark or Darlington, or any of the fruit townships of Northumberland, it is worth something to the people to know these things, and if the local municipal government takes the proper view of it, they will be willing to aid the assessor to secure the information. If it is a municipality where there is very little fruit grown, there would be very little work to do and it is not so important.

Mr. PEART: I should like to see this resolution or a similar resolution passed by the meeting so as to draw the attention of the Government to the matter. We are making no recommendation as to the method of procedure, but simply asking for further fruit statistics in detail.

Mr. James: If the assessment roll is to be enlarged by the addition of these columns, it can be done only by special legislation. It should, I suppose, receive its initiation through a representative body of fruit growers such as this.

Q.—What procedure would you suggest?

Mr. James: One way would be to ask the Government at the next revision of the Assessment Act to provide columns in the assessment rolls for the collection of such data regarding fruit trees as may seem desirable.

The Chairman then put the resolution to the meeting and declared the same carried.

On the resolution of Mr. Peart, seconded by Mr. Murray Pettit, the following were appointed to deal with the matter: Messrs. W. H. Bunting, Murray Pettit, and A. W. Peart.

REVISION OF THE CONSTITUTION.

The Secretary presented the following report from the Committee on Revision of the Constitution:—

Your Committee beg to report as follows:—

Clause 1.—Add after the word "Ontario" the following: "And hereafter in this Constitution shall be referred to as the Ontario Association."

Clause 4.—Insert the word "Financial" after the word "Association."

Clause 12.—After the sentence ending in the words "Annual Report," add the following: "He shall call the first meeting each year of the new Board of Directors within six weeks after the end of December."

Clauses 7, 8, 24, 25, 26, 27 and 28 shall be cancelled and the following substituted:—

7.—The election of directors shall take place in December of each year at Board meetings of the affiliated associations, as defined in Clause 28 governing affiliated associations.

8.—The newly elected directors shall, at the first meeting of the Board, appoint from among their number, a President and a Vice-President, and from among themselves or otherwise a Secretary-Treasurer.

24.—Fruit growers in any section of Ontario may form a local association, which, later, may become affiliated with the Ontario Association on the condition defined in Clause 26.

25.—It shall be the duty of the officers and directors of the Ontario Association to encourage the formation of such local associations.

26.—Any local association may affiliate with the Ontario Association when it has a membership of ten, upon the payment to the Treasurer of the Ontario Association of $5 for the first 25 members or fraction thereof above nine, and 25 cents per member for every additional member, which payment shall entitle the members to all the privileges and advantages of membership in the Ontario Association, including representation on the Board of Directors upon the terms defined in Clause 28.

27.—Fruit growers, who are members of two or more local associations shall be accepted as members of the Ontario Association from that branch association only which is the first to forward their membership fee to the Secretary-Treasurer of the Ontario Association.

28.—The directors of each affiliated association shall, during December of each year, appoint a director of the Ontario Association as follows:—

(*a*) Any association having ten members or over shall appoint one director, whose expenses when attending meetings of the Board shall be paid by the Ontario Association.

(*b*) At all Board meetings of the Ontario Association each director present representing any branch shall have the right to cast one vote for every twenty-five members or fraction thereof of his branch who are members also of the Ontario Association.

The proposed amendments were then taken up for discussion clause by clause. Section 1 having been passed, the clauses relating to representation on the Directorate of the Association were discussed. A number of views were given expression to in this connection.

Mr. W. L. Smith was of the opinion that a local fruit growers' association should be organized in each electoral district. These associations should each send a delegate to the convention. These delegates would form the Provincial association, and they should, from among themselves, elect a board of directors.

Mr. Caston contended that district representation must be preserved, and that where there was no local association the horticultural or agricultural society for the county should nominate a representative.

Mr. Lick stated that the one thing certain was that the directors must be elected by members of the Ontario Association and not by members of agricultural societies. He would give each paid-up member of the district associations one vote for a director for that district, and the name of the person elected should be forwarded to the secretary of the Provincial Association.

Mr. Robertson, of St. Catharines, recommended that representation should be proportionate to the membership of the local associations, as the importance of the industry in any given district should be taken into account.

Mr. Smith moved the following resolution: "That the Ontario Fruit Growers' Association shall consist of delegates elected by the local association, one such association to be formed for each Electoral District in the Province, and that these delegates shall elect in convention the officers and directors." Mr. Robertson seconded the resolution.

Mr. W. E. Wellington stated that a special committee should be appointed to deal with the matter. In his opinion the districts should be allowed to remain as at present; that each district should have at least one representative, and the number should be increased where the importance of the industry warranted it. This would give a representative meeting, and from among those present the directors should be elected by ballot.

Mr. Lick stated that most of the objection to the old method was on account of the directors having their travelling and other expenses paid while at the convention, which gave them an undue advantage.

Mr. Bunting thought it desirable to do away with the practice of paying directors' expenses, although it might work some hardship in the case of those who had to come a great distance. He would suggest paying their expenses to business meetings, but not to the annual convention. In order to get a more representative board he suggested that each association elect its representative by ballot.

Mr. R. B. Whyte, Ottawa, stated that in his district it would be practically impossible to form an organization, and that therefore it would be left without representation. He agreed with Mr. Wellington that the matter should be dealt with by committee. He therefore moved in amendment that the matter be referred to a committee consisting of the following: E.

Lick, H. Jones, W. L. Smith, G. A. Robertson, W. H. Bunting, D. Johnston, E. Morris, P. W. Hodgetts, and that the committee report to the convention at the earliest possible moment.

Mr. Smith, having withdrawn his resolution, the amendment became the original motion, and was put to the meeting and carried, and later the chairman of the committee, Mr. Lick, reported that all were agreed on the following principles: first, to leave the districts as they were at present; second, that each affiliated association having ten members should be admitted to membership in the Association; that the fee should be five dollars up to twenty-five members, and twenty-five cents for each additional member; that each affiliated association should send one delegate, and that for every twenty-five members after the first twenty-five, they should be entitled to an additional delegate, whose railway expenses to the annual meetings should be paid by the association.

Mr. Lick moved the adoption of the report and was seconded by Mr. Murray Pettit.

Mr. Thompson moved in amendment, seconded by Mr. Armstrong: That the Constitution be so amended as to provide that no director should hold his position for more than three years consecutively.

In the discussion that followed it was pointed out that this would result in the immediate loss of all the old directors, and the opinion of the meeting appeared to be that it was in the best interests of the association that changes in the directorate should be made gradually and with discretion.

Mr. Whyte moved in amendment to the amendment, seconded by Mr. Armstrong, that the four oldest directors be dropped off each year, and that four new men be elected to take their places, but that those dropping out should be eligible for re-election after the lapse of one year. Mr. Thompson having withdrawn his amendment, the chairman then put Mr. Whyte's amendment to the meeting, and the same was declared carried.

Mr. Bunting moved, seconded by Mr. Jones, that the report as amended be adopted.

Mr. Caston stated that he was strongly of the opinion that the local associations should nominate and elect their own directors for the reason that those nominated were often unknown to the general meeting, and could not be voted upon intelligently.

Mr. Thompson also endorsed this view.

Mr. Lick moved in amendment, seconded by Mr. Whyte, that the report be laid upon the table until after the election of directors had taken place.

The Chairman, having put the amendment, declared the same lost.

The motion to adopt the report as amended was declared carried.

The amended Constitution will be found at the end of the Report as "Appendix B."

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I am sure that it is with much pleasure that I have listened to the discussion in reference to peach growing. Much as that industry represents in this Province, we have still greater interests in the fruit line. These are days of changing conditions among us. Population is flocking to our large centres, the ever-increasing needs of the community are becoming more

apparent from day to day, and I believe that the fruit growing industry is something that bids fair to profit from this condition of things, more, possibly, than some other lines. I am glad that the fruit growers come together here from year to year to consult as to the best methods whereby this great industry may be fostered.

One thing has struck me very forcibly, and that is the apparent decadence of the apple industry, at least in some sections of our Province, and the lack of attention which is so noticeable in many of our orchards. This may not have impressed some of you so much as it has impressed me, because the majority of you come from districts where fruit growing has become a leading industry, and not merely one of the side lines of agriculture. There is, however, a great district in the western portion of the Province, and to the north of that, where the industry has apparently lost its influence upon the grower, and I believe that this Association should try to do a little missionary work in these sections. We should either get rid of these orchards or else put them into proper shape in order that they may be made productive and a source of revenue. Not only so, but I think the importance of combating the various diseases and insect pests to which fruit growing is heir should be impressed more and more upon the grower. Those of you who are represented here are looked upon as the cream of the fruit growers of the Province. You have been successful in the business, and you come here from year to year to profit by each other's experience; but the fact remains that the great mass of the people are untouched by this Association.

What has impressed me, and no doubt has impressed a great many of you also, is the opportunity fruit growing presents for making farm life more attractive. As I stated at the outset, conditions are changing. The flocking of the people to the cities, and the filling up of the west, is telling heavily upon our rural districts. What is wanted is something to make country life more attractive to our boys and girls, and thus maintain the even balance that is so necessary for our political and social well-being. It appears to me that the varied lines of fruit growing present some of the most attractive features known to rural life, and I think you have a great mission to perform in keeping these ever before the public mind. Our agricultural publications are doing much to popularize fruit growing, but much still remains to be done.

We are glad to have with us Prof. Parrott and Mr. Hale from the neighboring republic to discuss with us some of the methods adopted in that progressive land. Ontario is one of our banner provinces in the line of fruit production. It has a large territory to supply, but through our recent methods of co-operation in packing, the grading of our fruit, and the advanced legislation dealing with the matter, we believe that we shall be able to maintain our reputation both in the home and foreign market.

I would leave one thought with you, a thought that is possibly well-known to you, and that is that there never has been a time in the history of this country when quality counted as much as it does to-day in every line of production. We are having times of prosperity, and the people are willing to pay for a good article. To supply it should be the ideal of the producer in all lines of agriculture.

LOW-HEADED PEACH ORCHARDS.

By Chas. F. Hale, Shelby, Michigan.

While I have had experience with low-headed peach trees, and am prepared to advocate them, I do not know that I ever saw the topic presented to an audience before, and I hardly know what I am expected to say on the subject, nor do I know what you consider here to be a low-headed peach tree. We have in our section trees that are headed all the way from 6 inches to 5 feet. The man with the latter thinks they are low enough; while he who has them headed at 6 inches says they are none too low. I have had about eighteen years' experience in growing peaches, and will give you my own experience. They call me a fruit crank because I love the business and make a specialty of it—not only of peaches, but all kinds of fruit that we can grow—and nothing gives me greater pleasure than to spend my time talking about fruit. What, may I ask, has brought up the discussion of this question? If there is need to discuss it, it evidently shows that some of you have had trouble with high-headed peach trees or the subject would not have been presented.

In planting out an orchard I would head the trees where I want them to start, and this would be at about 18 inches from the ground. If I deviated from this, I would head them still lower. A few years ago we considered that about 2 1-2 feet was the right place to head the trees at the start, but we have found from experience that it costs more to carry these trees to a bearing age, and to spray them and to pick the fruit than it does with those that are headed lower, and expense is the great item for consideration.

In starting trees at that height I would endeavor to head them with not more than four limbs, if possible branching out in different directions, not all from the same point on the tree. I would have the highest branch not more than 18 inches from the ground and the others below. These branches form the start. At the end of the first year, I would practice heading back. I would at no time have the centre of the tree higher than the branches on the outside. It costs more to prune them when you have to send a man up a ladder to do it; the same with spraying the orchard. If you have to have something raised on which to climb to spray the trees, it is more expensive, and besides you cannot do as thorough work, and so in picking. Then, too, your trees are much more likely to break down with snow and storm if they are headed high, owing to the fact that you do not get that short, stocky growth but a spindling, willowy growth. We used to think that an ideal orchard was one headed so high that you could plow and cultivate right up to the tree trunks, but the fruit never did so well. It is natural for the peach tree to grow low. These are the main reasons why I would head a tree low and why I would keep it low. We prefer to have our trees 20 ft. apart and we keep them cut back so that we can reach them and control them. They are stocky trees and stand the winter well.

As to peach culture, I do not know your practice here. We practice thorough cultivation. We do not believe in sod methods. We have run across gentlemen from some States who tried to preach that to us, but we did not take to it kindly. If you want a good thrifty peach orchard or any other orchard, we consider that good thorough cultivation is just as necessary as in the corn field. In starting an orchard our practice is to grow some hoe crop in the orchard for two or three years. We have not found this detrimental, at least for two crops, if the ground is in any kind of condition when the orchard is set out.

Q.—What do you mean by thorough cultivation? How long does it extend through the season ?

A.—At least till the first of August.

Q.—Do you put any cover crop on the soil?

A.—Yes. As a general thing we use oats more than anything else. We have tried cow peas and other crops, but at the present time oats give the best results.

Q.—What implements do you use to reach under the low-headed trees?

A.—We use the plow and drag, that is about all. You can so arrange your plow or set it that you can put your team off to one side and plow closer to the tree than you think you can. Another thing, if the trees are low-headed, grass and weeds will not grow as rapidly near them. Then I take a common strong drag and zigzag around the tree with it.

Q.—Give us your method of pruning from first to fifth years.

A.—As a rule I cut back from one-half to two-thirds of the growth each year, beginning with the first year; perhaps more the first year. I have trees that made from three to five feet of growth the first year. I would cut them back to within a foot of the trunk.

Q.—How much thinning or pruning would you do before the trees commence bearing?

A.—The first year I would cut out nearly all the growth.

Q.—At what season?

A.—As early in the spring as possible. I do not know that there is any difference in the season, but, I think, if anything, that when the sap begins to start is the best time; but we cannot get through all our pruning then.

Q.—The third year do you pick the small fruit out in addition to thinning the branches?

A.—Yes. Every season after we get through pruning, we start to thin the fruit, and you would think if you saw us that we were doing our best to spoil the crops. After the tree is bearing we thin the fruit from 6 to 8 inches apart as a rule; at least we give this instruction to our men, and it is a good plan to keep away from the orchard while this work is being done, so that you may not change your mind.

Q.—Do you thin all varieties the same?

A.—There are some varieties that are shy bearers, and it is not necessary to thin them at all, but the heavier bearing trees should be thinned. Elbertas for instance are not apt to need very much thinning, while Golden Drop needs a great deal.

Q.—In the Siberian varieties have you ever tried to counteract the sterility of the blossoms, thus securing a larger crop of fruit?

A.—I do not know of any method that has been successful. They are of very fine quality but we have never found any method by which we could make them productive.

Q.—If you thin your fruit from 6 to 8 inches apart, how many bushels would be considered a good crop?

A.—From 3 to 4 bushels; but from 2 to 2 1-2 is a good average crop.

Q.—What fertilizers do you use?

A.—That is something we disagree on. Some use commercial fertilizers and some use legumes. If we cannot get anything else, commercial fertilizer is mostly used. I do not think any of us could answer the question positively. One year we think we have found it all out, next year, conditions change and we find we know little about it.

Q.—How do you prepare your land for planting?

A.—Just as you would for a corn crop.

Q.—Would you take a piece of sod land?

A.—If I wanted that piece of land I would, but it is not so easy to take care of the first year.

Q.—Give us a list of the varieties that have done best in your section.

A.—I can cut them down to a very few. When I first went into the business I had about 25 varieties. I planted about 5,000 trees during the last two years and they consisted of St. John, Conklin, Engol Mammoth, Elberta, New Prolific and Smock. Golden Drop has been planted very largely for canning purposes, and Kalamazoo and Bronson Seedling. They are very similar and ripen at about the same time. Conklin ripens at about the same time as Crawford. Of Elberta, 50 per cent. of the trees set out in the last three or four years have been of this variety. I class Elberta with the Ben Davis apple and the Keiffer pear. I do not think either of them are worth eating, but they market well.

Q.—How do you treat the borer?

A.—Dig him out. With low-headed trees where the branches grow low to the ground, I find we are not troubled one-tenth as much with borers. This is a point I intended to mention. Borers do not like to work in the shade. We are hardly giving a thought to borers any more. I have a young orchard two years old; I looked the trees over for borers this year and did not find a single one. I have heard many say the same thing.

Q.—How old are these low-headed trees?

A.—I have orchards six years old and no borers, that is none to speak of.

Q.—Not even the pin borer?

A.—No.

Q.—Do you think a man is likely to be bothered with borers unless he plants them?

A.—Yes, I do.

A Member.—Lots of men plant them but they think they do not.

Q.—What would be the average height of the trees in this six year old orchard?

A.—Not over 10 feet.

Q.—What distance apart do you plant?

A.—From 18 to 20 ft.

Q.—Does not the greater distance tend to make them low-headed?

A.—Yes. If they are crowded, they have to go somewhere and they go up.

Q.—At six years old how close do they come together?

A.—They will come right together. The lowest limbs on these trees will start 1 1-2 feet from the ground. We are heading lower now than then. By practising the pruning back system, the lower branches are not so apt to die.

Q.—Have you tried the Oceana Peach?

A.—This peach originated within a few miles of where I live. While I am not raising it, I have seen some very nice specimens. I do not think it is as good as some of the other peaches, but is a very nice late variety.

Q.—Your heading back the lower branches forces new wood up in the body of the trees, does it not?

A.—Yes.

Q.—Are you growing the Dewey?

A.—I planted some, but would not again. They were supposed to be free stones when we got them. They are a very nice peach for an early variety, but at the same time I would rather have a white peach. They sell just as

well. We have a variety called the Davidson which is a very fine white peach and a heavier bearer. They are fairly free and the peaches are nearly as large again as the Dewey.

Q.—What about Engol Mammoth?

A.—It is one of the best.

Q.—Is it a larger peach than the Crawford?

A.—No, about the same size. The old Crawford peach is apt to have several large specimens and a lot of smaller ones. Engol Mammoth is more uniform.

Q.—What is your objection to the Late Crawford?

A.—It is a very shy bearer.

Q.—Have you a light sandy soil?

A.—Yes, a light loamy soil.

Q.—Is the Dewey free from rot?

A.—No.

Q.—I suppose you spray with bluestone in the spring?

A.—I spray everything in the fruit line.

Q.—Do you find that spraying with bluestone stops curl leaf?

A.—Yes, it will do so. With this object you should spray as soon as you can get on the ground. I would not use the Bordeaux, but just the bluestone without any lime, 2 1-2 to 3 lbs. to 50 gals. of water. We give but one spraying for curl leaf. I know many men who spray and then say it does not do any good. But they are not thorough. I have heard the remark made here this afternoon that you could not control the codling moth by spraying. Now, I know that you can. I have seen it done a good many times, so that you will have almost 90 per cent. apples. But if you a leave a part of the tree or a branch, I do not care how small it is, the work is not done thoroughly, as it must be if the pest is to be controlled. I remember that twelve years ago, after I had practised spraying for three or four years, I thought I was a pretty good hand at it. One day I heard Prof. Taft say, "Be thorough." In talking with him after the address I said, "There is one question I want to ask you. I want you to beat it into my head so that I will know what the word 'thorough' means. I have heard what you have said about thorough spraying, and I thought I had been doing it, and yet I have not got the results you guarantee we can." He said "I will try and explain what I mean. I had a class of boys at the College and sent them out to do some spraying with lime. I had impressed on them that I wanted a good thorough job done. They reported after a time that they had done it and I went to inspect. It looked all right, but I found on close examination that on one side a small part of one of the branches was not covered. I said, "Boys, if you had covered that you would have done a thorough job."

Q.—Have you the San Jose scale?

A.—Not in our immediate vicinity, but we have it in Michigan.

Q.—You do not have to spray for it then?

A.—Not yet, but we shall come to it.

Mr. Robertson: Those who have sprayed with lime and sulphur for scale claim that it is just as effective in curing curl leaf.

Q.—How do you treat the codling moth?

A.—Seasons differ greatly, and climatic conditions are different. One spraying will not do it, two sprayings will not do it; some years it may, others it will not. This year in our vicinity we had a dry season and we had no fungus and no scabby apples, and on that account some of us neglected some of the later sprayings. Up to August first the apples were smooth and nice, then the second brood of the codling moth got in its work; but there

were some orchardists who did their spraying as usual, and they have not more than 10 per cent. of wormy apples.

Q.—When did you give the last application?

A.—From the first to the 10th of August.

Q.—What do you use?

A.—Just Bordeaux mixture with arsenic of some kind in it. We use Paris Green mostly.

Q.—How much Paris Green?

A.—About 1-2 lb. to 50 gals. of Bordeaux mixture.

Q.—Do you grow sweet cherries?

A.—Yes.

Q.—Do you head them low?

A.—Yes.

Q.—Do you think they can be headed low and grow successfully?

A.—I do not know why they should not do so.

Q.—What distance do you put them apart?

A.—16 feet on an average for sweet cherries, and we are heading them as close to the ground as we can.

Q.—Have you had any trouble with the larger branches healing over after pruning?

A.—I never had any trouble.

Q.—Can you control fruit rot by spraying with Bordeaux in a wet season?

A.—I cannot.

Q.—Did you ever hear any one say they could?

A.—Yes, I used to say so. A man may have good results one year, but the next year it will be a failure. A few years ago I would have told you on my word of honor that I could control it. I tell you now that I cannot. On plums it is very troublesome. I never had any rot on them until two years ago; then they just wilted right down. That is an exception of course. I think spraying helps it.

Q.—Have you practised low-heading in other trees?

A.—We are heading all our trees lower than we used to. Apples are being headed about 2 1-2 to 3 ft. from the ground.

Q.—What is the cost of pruning a peach tree until it is six years old?

A.—If it has been pruned every year, it would cost much less than if the pruning had been left until the sixth year. If the orchard is six years old and has been pruned every year and it is a thrifty, healthy orchard, allowing from 12 to 15 trees per man per day, and paying him $1.50 a day, we can form a very good idea. Some men will prune 30 trees a day, but this is an exception.

Q.—Do you head back your side limbs immediately?

A.—Yes.

Q.—Where do you get your help for thinning?

A.—We cannot get one-half the help we need in Michigan. Not one-half the pruning has been done the last two seasons that would have been done if help could have been had.

Q.—In starting your peach orchards do you advocate cutting off all the side branches and laterals that are on the trees coming from the nursery rows, thus reducing them to a whipstock?

A.—Yes.

Mr. Armstrong: I should like to say that this is not my practice. I think I have something better. I agree with you in regard to the height. My practice is to trim everything off to about 12 in. to 24 in., but to leave

4 or 5 of these short limbs that were growing one year in the nursery, heading them back to the bud, for the reason that if you leave four or five of these little arms on the old stock and start your bud from one of these arms, you will have a stronger growth because it is one year older.

A.—I would follow that practice with large trees, No. 1's as we call them, but if you are planting the slender, smaller trees, they have not got as many laterals, anyway, and by cutting them off and allowing the bud to start from the tree, you can get it better where you want it.

Q.—We find that nurserymen have the habit of cutting off these small limbs for the purpose of lengthening the height of the tree.

A.—That is where we have to educate them a little. We should refuse to take these trees.

Q.—At what season of the year do you prefer buying your trees?

A.—If I am dealing with a nurseryman who has a good place in which to winter his stock, I would prefer that he should winter them and let me take them in the spring.

Q.—Does he dig them up or leave them in the nursery row?

A.—Digs them up.

Q.—What aged stock do you use?

A.—One year old stock.

THE SAN JOSE SCALE, ITS LIFE HISTORY, SPREAD AND REMEDIES.

Prof. P. J. Parrott, New York Agricultural Experiment Station, Geneva, N.Y.

As I was examining your beautiful exhibits of orchids, carnations and chrysanthemums, and your extensive collections of fruits in Massey Hall this morning, it occurred to me what a pity it was that it is necessary at this time to discuss such obnoxious pests as bugs and plant diseases. But as there is good and evil in the world, so there is sound and bad fruit, and a large part of the bad fruit is due to the ravages of insects and fungi. Perfect fruit can hardly be grown to-day unless efforts are made to control these enemies. The insects especially play an important role in human economy; and if you are a reader of current events, you cannot help being impressed with the rapid strides that the study of insects has taken among the biological sciences and its important relation to public health and prosperity.

Within the past few years attention has been directed to the ravages of the boll weevil in the cotton fields of the south, the disease-disseminating mosquitoes on the sea coasts, the threatened invasion of California by the Mexican orange worm, the destructive work of the Gypsy Moth and the Brown Tailed Moth in the parks and woodlands of New England, and the appearance of the San Jose Scale into the principal fruit-growing areas of Canada and the United States. All these are insect problems of national interest and their solution is of vital importance to those communities directly affected by them. There was never a time when so much attention was being directed to the study of destructive insects, and never before has so much money been spent to control them. On the other hand there never was a time when our fruit growers were so well equipped with insecticides

and spraying machinery to hold these pests in check. There is hardly an insect pest but what will yield to scientific treatment. This holds true with the San Jose Scale, which at this time is of so much concern to you.

Its Habits. Now to fight an insect successfully we should be able to recognize it and should know its life history, and the particular stage in its life when it is most susceptible to treatment. Success in fighting insect pests is often determined by this knowledge. The scales constitute a peculiar group of insects which differ in many ways from the active and highly colored forms usually familiar to the casual observer. They are very inconspicuous because of their small size, dull colors and sedentary habits. This is especially true of the orchard species, for they so closely resemble the bark of the trees that at first glance they appear to be a part of it. Failure to recognize the insect and its work may result in irreparable injuries to an orchard.

First of all then, let us consider the nature of the San Jose Scale and its habits, which are well illustrated by the models at hand. These represent the development of the San Jose Scale, which agrees in many respects with that of other common orchard species. Here we have a representation of the young female scale, or mite, much enlarged, which on being born is a microscopic six-legged animal, yellow in color and exceedingly active. This has, as you may observe, many of the parts that characterize a typical insect, which are one pair of feelers, three pairs of legs, and a sucking bill or proboscis, by means of which it obtains its nourishment. Within a few days after its escape from the mother scale, it settles down upon a suitable place and thrusts its beak through the bark into the sap upon which it subsists. Soon there emerge from pores in its body waxy filaments, which gradually become compacted forming a white coat or the first scale. As the insect grows it sheds its skin, which becomes attached to the scale. This appears as a yellow colored nipple-like prominence in the center of the San Jose Scale or at the smaller end of the scale of the oyster-shell, bark-louse, and the scurfy bark-house. In this first molt the female loses its legs, feelers and eyes, but unfortunately she retains the sucking bill. With increase in the size of the body, there is a corresponding enlargement of the protecting scale by the excretion of a waxy substance to its margin. The mature female appears as a wingless, footless, eyeless, grublike creature, as you can observe, which never moves from the spot where she first attached herself as a mite, and which is concealed from the light by a shield or scale of her own excretion. This grub, much enlarged, is the insect herself and this scurfy, filmy body is her protective covering which is composed of the cast-skins ad waxy substance from the insect's body. Hence the name, scale insect. After the approach of the male in pairing time, the female enters upon her period of reproduction, at the end of which she dies. The number of offspring varies with the individual, sometimes running up into the hundreds. As there are several broods during one growing season, one female surviving the winter may be responsible for hundreds or even millions of offspring. The male in his early history closely resembles the female, but forms a scale quite different in shape. After the second molt marked, changes take place in his body, and rudiments of external appendages develop; and later when mature, he appears as a small fly, with a pair of wings, by which approach to the other sex is made possible.

Remedies—Some Principles. Broadly speaking, insects may be divided into two classes, first, those that have distinct jaws, by which they are able to bite off or gnaw off small portions of leaves, bark or wood of a plant; and second, those with mouthparts shaped to form a bill or sucking beak, which can be thrust into the layers of bark or leaves to the underly-

ing tissues and used to suck up the plant or plant juices. The former are controlled by coating the plant attacked with some poison such as Paris Green or London Purple, or other arsenical sprays, so that some of the poison may be included in the food of the insects, while the latter, because of their peculiar manner of feeding, cannot be killed by poisons, and to be destroyed, must be coated with some substance that will clog or seal up the breathing organs, thus choking it to death. The sprays that accomplish this end are called contact remedies.

The scales are sucking insects, but because of their peculiar habits, and wonderful reproductive powers they are more difficult to control than many insects obtaining food in a similar manner. To successfully control the San Jose scale, requires very careful and thorough spraying, that all individuals may be coated with the spraying mixture. If this is not done, the specimens escaping the treatment will live to produce an enormous number of young to infest the tree again. One of the most discouraging features in fighting this pest arises from this very cause. Often the spraying is so imperfectly done, that the offspring from the surviving are numerous enough in one season to make up for the numbers destroyed. In this event little benefit has been derived, and another treatment must be made to prevent the rapid increase and spread of the scale, and to save the trees. To careless work, rather than the kind of spraying mixture used, may often be assigned the cause of the failures to control the scale. The successful treatment of this pest calls for intelligent and persistent spraying. Learn to recognize the scale, know its life history, and follow closely the instructions for the preparation and application of the standard spraying mixtures. The degree of success that will attend your efforts depends to a large extent upon the use that is made of that knowledge.

Methods of Controlling the Scale. The San Jose scale is rapidly spreading into our leading fruit growing sections of New York. In those communities where it is well established, annual spraying for the scale is practiced by the more progressive fruit growers. The orchardists experienced in this work are fighting the scale efficiently and profitably upon peaches, plums, pears, and apples of moderate size. The spraying mixture which gives the most satisfactory results on scale is the boiled lime-sulphur wash. This is used by the larger number of our fruit growers, although some are using the proprietary miscible oils or mineral oils, either clear or emulsified. The lessons our fruit growers have learned from their own experience and the methods that they have developed in fighting the scale to meet their own individual needs, are soon taken advantage of by fruit growers in other communities, where the appearance of the scale is of more recent origin; so that now there is usually not that unnecessary destruction of the trees while the orchardists is familiarizing himself with the proper methods of fighting this pest, as used to be the case. Our successful orchardists are much alarmed at the spread of the scale and are prepared to protect their trees as soon as any infestation is detected.

There is one phase of the scale problem that is not satisfactory, which is, that the spraying of old apple orchards has not usually been successful. In many localities where the scale has been longest present, there are orchardists complaining that it is impractical to spray old orchards for the scale as it has been impossible for them by known methods of treatment to keep the trees in a sufficient healthy condition to produce clean and profitable crops. Disheartened by the poor results attending their efforts, certain of these fruit growers are now neglecting their trees which are dying, thus eliminating one of the principal sources of income of the farm. To protect the old orchards is the remaining important phase of the scale problem.

A Business Experiment in an Old Apple Orchard. To ascertain the difficulties encountered in spraying large trees, and to determine if there are practical methods of protecting commercial apple orchards, the Geneva Station is co-operating with a number of fruit growers in the treatment of their orchards, special attention being given to old trees. The details in the experiment at Mr. Dutton's orchard at Youngstown will be of interest to you. This orchard has an extent of twenty acres, consisting of 598 trees of at least forty-five years of age. The varieties represented, and the number of trees to the variety are 380 Baldwins, 135 Greenings, 40 Spitzenburgs, 16 Kings, and some summer kinds. The rows are numbered from east to west. There are twenty-eight rows and there are twenty-three trees to the row.

History of Scale in this Orchard. The scale was discovered in 1900 on one Greening, and in 1903 it was more or less distributed throughout the orchard. In 1904 the crop of Greenings in rows 2-6 inclusive, were badly spotted, and the bark of the trees was much incrusted. Some trees were so severely injured that many branches and occasional limbs were dying. The Spitzenburgs, rows 7-8, and Baldwins, 9-11, showed conspicuous spotting of the fruit. The remainder of the orchard, with the exception of some trees along a ditch, running irregularly through rows 13-17, was to a large extent clean, only a little fruit having scale blemishes.

Experiments in Orchard. In 1905, crude petroleum was applied to 207 trees, boiled lime-sulphur wash to 345 trees, and kerosene-limoid to 47 trees. Items of expense for spraying orchards were as follows:

Cost of Spraying Apple Orchard in 1905.

Crude Petroleum.

Twenty barrels of crude oil @ $4.60	$92 00
Three men for three days @ $1.50	13 50
Team for three days @ $2.00	6 00
Wear on sprayer (2½ per cent. of cost)	11 25
Total	$122 75
Number of trees sprayed, 207.	
Cost of oil per tree	44
Cost of labor and team per tree	9
Cost of treatment per tree	59

Boiled Lime-Sulphur Wash.

3,750 gallons of sulphur wash:	
1,125 lbs. sulphur @ 2¾c.	$30 94
1,500 lbs. lime @ 45c. per cwt.	6 75
Fuel	3 00
Four men for five days @ $1.50	30 00
Team for five days @ $2.00	10 00
Wear on sprayer (2½ per cent. of cost)	11 25
Total	$91 94
Number of trees sprayed, 345.	
Cost of sulphur wash per tree	12
Cost of labor for making wash per tree	02
Cost of labor per tree	10
Total cost of treatment per tree	27

Kerosene-Lime Wash.

1,000 gallons of kerosene-lime wash, 25 per cent. oil:	
250 gallons of kerosene @ 10c.	$25 00
1,000 lbs. lime @ 50c. per cwt.	5 00
Four men for 1½ days @ $1.50	9 00
Team for 1½ days @ $2.00	3 00
Total	$42 00
Number of trees sprayed, 69.	
Cost of wash per tree	43
Cost of labor for making wash per tree	03
Cost of labor per tree	14
Total cost of treatment per tree	60

Cost of Spraying Apple Orchard in 1906.

Boiled Lime-Sulphur Wash.

10,000 gallons of sulphur wash:	
3,000 lbs. sulphur @ 2¾c.	$82 50
4,000 lbs. lime @ 45c. per cwt.	18 00
Fuel	4 00
Seven men for 9 days @ $1.50	94 50
Two teams for 9 days @ $2.00	36 00
Wear on sprayer (5 per cent. on cost)	22 50
Total	$257 50
Number of trees sprayed, 586.	
Cost of sulphur wash per tree	18
Cost of labor for making wash per tree	02
Cost of labor per tree	20
Total cost of treatment per tree	44

The following table is a general summary of data given, showing number of gallons of each mixture used to spray one tree, and cost of treatment.

Tabulated General Summary.

Name of spray	Average per tree			Cost of treatment	
	No. gals.	Cost of spray	Cost of labor*	Total per tree	Average per acre.
Petroleum	5	$ .44	$ .09	$ .59	$17.70
Boiled lime-sulphur wash....	14	.15	.17	.36	10.80
Kerosene-lime wash	14	.43	.17	.60	18.00

Results of Spraying in 1905 and 1906 on Scale and Tree. The applications of crude petroleum in 1905 to rows 2-10 inclusive, as shown by this chart, delayed leafing three weeks, and destroyed the fruit crops. The oil was a most efficient spray on scale, the effects lasting through 1906. The trees receiving this treatment are to-day in much better condition with respect to scale and thriftiness than in 1904. The sulphur wash caused no injuries, and was usually not quite so effective as the applications of the oils. The kerosene-lime mixture severely injured fifteen trees and gave variable results on scale. In 1906, the orchard was sprayed with the boiled lime-sulphur wash, with no apparent injuries to the trees. The general appearance of the trees in early summer was better than in 1904, which was largely due to the greater improvement of the Greenings. On August 11, the orchard seemed in better condition with respect to scale than for several

* Includes labor in making spray.

years, as very little fruit was spotted. During September and October, the scale was unusually prolific, resulting in more or less spotting of fruit, which in this respect was marketable. The crop of Greenings, rows, 3-6, with exception of two trees, was quite clean. The Spitzenburgs and Baldwins, rows 7-12, were very clean. The worst infested part of the orchard was along the ditch running through rows 14-17, and the northern part of rows 21-25. The scale was well controlled in the eastern half of the orchard, but was more abundant in the western half. The fruit yields in 1904 were 9,000 bushels; in 1905, 2,100 bushels; and in 1906, 3,000 bushels. The fruit this year was much injured by the codling moth, the control of which was not a part of the experiment.

Summary of Results.

Sulphur washes are cheap, safe and reliable sprays for the treatment of peaches, plums, pears and apple trees of modern size, and are specially recommended for the treatment of peaches for joint control of scale and leaf curl. Applications must be thorough. Good nozzles and a pump with high pressure to produce a fine spray are essential. Cost of spraying per tree is variable, depending on management, weather conditions, labor, kind and cost of fuel and spraying supplies, and degree of thoroughness of spraying. In spraying trees from five to eight years of age, the cost of treatment will vary from 5c to 13c per tree in commercial orchards. Apples from thirty to fifty years of age will cost from 20c to 50c per tree to obtain reliable results on scale.

Treatment of old apple orchards has not been usually successful, largely due to the lack of thoroughness in spraying. Best results on scale have been obtained by orchardists by careful pruning of trees and by spraying with sulphur washes and crude petroleum on alternate years. By this system of treatment orchardists that were fearful of losing their orchards have this year marketed comparatively clean crops. Average cost of sulphur wash per tree 36c, crude petroleum 59c. Crude petroleum is the most efficient spray on scale but may injure trees. It is believed that for results of work that applications of sulphur wash or crude oil emulsion, twenty-five per cent. oil, would prove equally effective on scale without risks of applicable injuries to trees. Commercial insecticides, in all but two of experimental orchards were much less effective than the sulphur wash.

Crude Petroleum.

For spraying purposes a grade testing about forty-three degrees Beaume should be used. This is a most efficient spray on scale, but dangerous if used in excess on trees. *Apply clear petroleum on old apples only on a sunny day as buds swell and stop spraying when oil commences to run on bark.* Only nozzles with fine apertures should be used. *Resort to oil treatment for apples is only advised after failure to control scale by sulphur wash.*

Home-Made Oil Emulsions.

Kerosene Emulsion.—Dissolve one-half pound of soap in one gallon of boiling water. Remove vessel from near the fire and add two gallons of kerosene. Emulsify the whole by pumping it continuously through a small force pump until a creamy mass is formed, from which the oil does not separate. This is the stock material. For mixture containing ten per cent.

oil, dilute whole of stock material with seventeen gallons of water, and for a mixture containing twenty-five per cent. oil, dilute stock material with five gallons of water.

Then ten per cent. oil mixture may be used as a summer spray to check breeding of the scale. If this strength can be used safely on the foliage, increase the percentage of oil gradually in remaining preparations until a twenty-five per cent. oil mixture is reached, if no injuries to foliage in the meantime follow. A twenty-five per cent. oil emulsion will kill both young and old scales, and may be safely used for the treatment of trees in early spring as buds are swelling.

Crude Petroleum Emulsion.—Dissolve one-half pound of soap in one gallon of boiling water, and stir in one-quarter pint of liquid crude carbolic acid (100 per cent. straw color). Remove vessel from near the fire and add two gallons of crude petroleum. This should be emulsified after the manner of making kerosene emulsion.

For a mixture containing twenty-five per cent. crude petroleum, add five gallons of water to the stock material. This is advised for the treatment of trees in the spring as buds are swelling.

Proprietary Oil Emulsions.

A number of these proprietary emulsions, known as Scalecide, Kil-O-Scale, etc., are now on the market. These are handy preparations for treatment of a few trees and when conveniences for preparing home-made remedies are wanting. To obtain satisfactory results, two applications should be made, using from seven per cent. to ten per cent. of the stock emulsion.

Sulphur Washes.

The boiled lime-sulphur wash:—

Lump lime	20 lbs.
Sulphur	15 lbs.
Water	50 gal.

Slake the lime with hot water and make a thin whitewash. Stir in the sulphur and boil mixture one hour. Dilute mixture with water to make required amount of wash. Flowers of sulphur, and light and heavy sulphur flour may be used. *This is the best spray for the average orchardist and is especially recommended for the treatment of peaches. Should be applied to dormant trees in spring.*

The self-boiled lime-sulphur wash.

Lump lime	30 lbs.
Sulphur	15 lbs.
Caustic soda	4 to 6 lbs.
Water	50 gal.

Place lime in receptacle and start it to slake with water, hot preferable, using enough to make a rather thin paste. As soon as boiling action commences, add the sulphur, which has just previously been made into a paste with water. After the slaking of the lime, add the full amount of caustic soda and stir till the soda is dissolved. Dilute the mixture with water to make the required amount of wash. The soda used in this wash is a powdered seventy-four per cent. caustic soda, made in Philadelphia, Pa. This mixture is advised when conveniences are wanting for the preparation of the boiled sulphur wash.

The self-boiled salsoda wash.—

Lump lime	20 lbs.
Sulphur	15 lbs.
Salsoda	10 lbs.
Water	50 gal.

"Put five or six pailfuls of hot water in a wooden barrel, preferably a thick pork or oil barrel, add the lime, quickly following that with the sulphur and the salsoda, and stir till the slaking is practically completed. It may be necessary to add cold water at intervals to keep the mixture from boiling over. When boiling ceases, cover barrel with burlap and allow it to stand fifteen to thirty minutes or more. This mixture is advised when the conveniences are wanting for the preparation of the boiled sulphur wash." (Dr. E. P. Felt.)

Cost of Spraying Mixtures.

With copper sulphate at $7.00 per cwt., Paris Green at 25c. per lb., arsenate of lead at 14c per lb., lime at $1.10 per barrel, sulphur at $2.50 per cwt., caustic soda at 5c per lb., salsoda at 2c per lb., kerosene at 12c per gal., limoid at $2.50 per barrel, Scalecide at 50c per gal., crude petroleum at 11c per gal., whale-oil soap at 4c per lb., and crude carbolic acid at 39c per gal., the cost of raw materials for making one barrel, fifty gallons, of the several mixtures is as follows:

1.	Bordeaux mixture	$ 38
2.	Bordeaux mixture with ¼ lb. Paris green	14
3.	Bordeaux mixture with 3 lbs. arsenate of lead	80
4.	Lime-sulphur wash	50
5.	Lime-sulphur-salsoda wash	70
6.	Lime-sulphur-caustic soda wash	81
7.	Kerosene-Limoid wash (10 per cent. oil)	82
8.	Kerosene-Limoid wash (15 per cent. oil)	1 23
9.	Kerosene-Limoid wash (20 per cent. oil)	1 64
10.	Scalecide (5 per cent.)	1 25
11.	Scalecide (8 per cent.)	2 00
12.	Scalecide (10 per cent.)	2 50
13.	Crude petroleum	5 50
14.	Kerosene emulsion (10 per cent oil)	65
15.	Kerosene emulsion (25 per cent oil)	1 56
16.	Crude petroleum emulsion (10 per cent. oil)	67
17.	Crude petroleum emulsion (25 per cent. oil)	1 67

REPORT OF COMMITTEE ON RESOLUTIONS.

We desire to place on record an expression of our warm approval of the action of the Dominion Government, in having, in response to the request of this and other organizations, procured the passing of legislation placing the control of express rates in the hands of the Railway Commission.

We hope the action of Parliament in giving a legal definition to No. 2 grade of apples will have the effect of giving to the produce of Canadian orchards a still better standing in the markets of the world.

We desire to express our thanks to the Hon. Sydney Fisher for his action in calling a Dominion conference of fruit-growers last March, a conference

which resulted in harmonizing many little antagonisms between the Provinces, in bringing fruit-growers from all parts of the Dominion together for united action, and in giving a still further impetus to what has become a great national industry.

We believe the thanks of every commercial fruit-grower in Ontario are due to Alexander McNeill, chief of the Ottawa Fruit Division, for the remarkably full and correct reports issued by him during the late growing season in regard to fruit conditions and prospects—reports which placed growers in a measure on a footing of equality with buyers in regard to factors governing market conditions.

We would, however, strongly recommend that fuller information than we have now be given in regard to crop conditions and market prospects in other countries, and that to this end the Department of Agriculture at Ottawa be asked to secure the co-operation of the Department of Trade and Commerce in securing reports from Canadian commercial agents in Great Britain, Australia, and South Africa, in regard to probable production before crop maturity; also that the co-operation of horticultural associations in the United States be secured, and an exchange of timely information with these be arranged for.

We regret that, aside from the action taken at Ottawa, resulting in placing of express rates under the control of the Railway Commission, comparatively little has been done in regard to transportation during the present year. We most strongly urge that action be taken by the Transportation Committee during the coming year, looking to a material reduction in freight rates on apples, and a sweeping cutting down in express rates on all lines of fruit.

That this association would urge the Minister of Inland Revenue for the Dominion to amend the Act respecting staple commodities (that *re* fruit baskets) in accordance with the resolution passed by the fruit associations, and that the Government make, and stamp the forms and issue them to the basket manufacturers to ensure uniformity of fruit packages.

That inasmuch as a large number of fruit-growers are using carbonic acid gas as a source of power in their spraying operations, and as a great deal of difficulty has been experienced in securing a satisfactory supply in Canada, we would respectfully urge upon the Dominion Government the desirability of instituting some system of registration of the containers, so that these containers might pass freely to and from the United States, duty being levied upon the gas only. By this means a satisfactory supply might be available, and spraying operations greatly facilitated.

We strongly urge that the Department of Agriculture for Ontario, in addition to what is now being done and in addition also to what has been asked in the resolution adopted on the motion of Mr. Peart, arrange for obtaining special reports, after fruit has set, from the most reliable growers from the sections in which fruit is largely grown.

We strongly approve of the main point in the Robertson resolution, namely, that legislation be asked which will provide that nurserymen shall guarantee their stock as true to name, and that where the promise is not fulfilled, a reasonable and just penalty be imposed.

We are delighted to note the extension of the co-operative movement among fruit-growers in the Province; regret that comparatively little has been done this year in the extension of this movement by this association, and strongly urge that an officer be appointed whose duty it shall be to give his whole time to the encouragement of organizations now formed, and to creating of new ones.

That we desire to show our unbounded gratification at the splendid public spirit shown by Mr. Rittenhouse of Chicago, in giving a farm for experimental work in tender fruits, and in the prompt action of the Ontario Department of Agriculture in providing for the equipment of the same.

That a deputation visit the Minister of Agriculture for Ontario before this convention adjourns to press for the Ontario legislation asked for in this and the Peart resolution. Also that copies of resolutions relating to Dominion matters be forwarded by mail at once to Hon. Sydney Fisher.

We desire to place on record our warm appreciation of the invaluable services rendered by the directors of this association, many of whom have served long terms in office, frequently at serious inconvenience to themselves. We recognize also the splendid spirit shown by these same directors, now that a new stage of development is called for, in so frankly joining in the movement to make the organization more representative than it is at the present time.

That the thanks of the Association be extended to Mr. Hale of Michigan and Prof. Parrott of New York for their valuable addresses and their attendance at the meetings.

On motion, the report of the Committee on Resolutions was adopted.

On motion of Mr. Harold Jones, seconded by Mr. G. C. Caston, the following gentlemen were nominated by the chair to wait upon the Provincial Minister of Agriculture forthwith and place before him the resolution adopted by the convention in reference to the gathering of statistics by the Province respecting the fruit industry: W. H. Bunting, Murray Pettit, Wm. Orr, Harold Jones, Elmer Lick, H. H. Groff.

THE FUTURE OF THE APPLE IN ONTARIO.

By A. McNeill, Chief of Fruit Division, Ottawa.

If the subject of my address had been chosen by myself, it might have been suspected that I laid some claim to the prophetic faculty. Such is not the case, however, and whatever conclusions I shall draw are based upon facts, a few of which I shall present to you this afternoon; you will be just as capable as I of judging whether the conclusions arrived at are correct or not. My object in bringing these facts before you is largely for the purpose of having them criticized, as I am not sure that the conclusions I am drawing are final; or at any rate, I am not so sure but that I shall welcome any criticisms you may make respecting them.

Apple growing is the largest fruit interest we have, and the future promises a still greater expansion for this industry. The apple and its products account for nearly five million dollars of the exports from Canada and, with mixed farming, the domestic trade certainly amounts to five if not ten times that amount. The extraordinary development of the apple growing industry in some parts of Ontario in the last few years on the one hand and, on the other, the complaints we hear respecting it from some sections, some of which were voiced by the Provincial Minister of Agriculture in his address, indicate that there is an extraordinary condition of affairs surrounding the industry. It is part of my purpose to endeavor to explain some of these seeming anomalies. I have no hesitation in confessing that in dealing with the subject I have kept the industrial end—the money-making end—constantly in view, and that I am not referring to the growing of apple trees

simply for the pleasure of growing them, nor for the purpose of providing a supply of fruit for home consumption. My thought is simply to investigate with the object of putting the apple growing industry on such a basis that the producer may get the most out of his efforts in orcharding.

The map before you will illustrate my subject. This map shows four districts in Ontario in which the apple is an important product. Parts of the Province are not suitable for commercial apple growing, but the remainder of the Province I have divided into four districts where the industry is of importance and where it may be followed with very great profit. To understand the differences that exist between these districts, it is necessary to consider somewhat their physical features and climatology, as these determine to a large extent the development of the industry. You will bear in mind that there is no distinct line of demarkation between these districts—the one shades imperceptibly into the adjoining one.

The District marked No. 1 comprises the Lake Erie group of counties, including the western end of Lake Ontario. Here there are about two million apple trees of bearing age. It is the Canadian peach belt, where the peach, plum, quince, sweet and sour cherry and the smaller fruits are, generally speaking, perfectly hardy. There is a marked difference between the temperature of this district and that of District No. 3. By May 8th the Ben Davis apple will be in blossom at Windsor, but it would not be in blossom at Lindsay until at least two weeks later. At Windsor no frost would be expected that would kill the leaves of the grape previous to October 10th or 15th, but in District No. 3, or in the greater portion of it, September 15th will often bring a frost sufficiently severe to touch tender vegetables. While there may be just as high temperatures in District No. 3 as in No. 1, the periods of heat are of shorter duration. The result of these conditions is that the apple starts growing two weeks earlier in District No. 1 than in District No. 3, or in the greater part of District No. 2. Then during the summer months it is subjected to a higher average temperature, which condition continues well on into October. The effect of this is that winter apples in this section are mature perhaps a month before they are mature in Districts No. 2 and No. 3, the practical effect of which is to put District No. 1 out of business, when ordinary conditions prevail, so far as the winter apple trade is concerned.

To-day the people of this district are wondering why the apple trade is not prospering with them. Notwithstanding the apparent scarcity of apples this year, there are thousands of bushels wasting in this section. Although the explanation is an easy one, there are a good many people who do not see it. The apple buyers' explanation is that the winter apples growing in this section do not keep. This is not really the case. The fact is that the buyers have discovered a source of supply the apples of which may be held on the trees three to five weeks later in the season, which makes the fruit more profitable to handle from the exporters' point of view. It is not that the apples of this district will not keep, but that they mature three or four weeks too early for the best export trade. For this reason the buyers have abandoned the district so far as winter apples are concerned, and while a certain class still do business there, they purchase only such apples as they can see an immediate market for. The district is obliged to market its apples under ordinary conditions by the end of November, or at least before Christmas, and if the market is not good at that time, the buyers are apt to throw up their bargains, and are in any event very cautious about making them.

This is not the case in portions of Districts Nos. 2 and 3, because there the apple operators can buy with confidence, for the reason that they know

Explanatory Notes on Map.

District No. 1 grows all the tender fruits, such as peaches, apricots, dwarf pears of all varieties, tender and all varieties of apples, plums, pears, cherries, etc. This region is specially adapted to early fruits and vegetables, being from ten days to two weeks ahead of the districts surrounding the large markets.

District No. 2 grows excellent winter apples of all varieties to perfection. It is characterized by a large number of comparatively small orchards containing numerous varieties of fruit. Many portions are excellently adapted for plum and pear culture.

District No. 3 is specially adapted for winter apples. There are many large orchards especially on the shore of Lake Ontario. The farmers here are making a specialty of orcharding. District 3(*a*) on the Nottawasaga Bay should be classed with District 3, having large orchards of comparatively few varieties of winter fruit.

In District No. 4 the ordinary winter varieties are not hardy. This District, however, grows Fameuse, McIntosh Red, Wealthy and Wolf River to perfection. The first two are dessert apples that if properly packed should command the very highest prices as dessert apples. District 4(*a*), the midland counties of Western Ontario, on account of their altitude, must be classed with District 4. In this district the ordinary winter varieties grown in the adjacent counties are not hardy.

they have an apple which they can store if the market is not good, and if they have to hold them even for a considerable time, the loss is a small one. This explains why the industry has not prospered of late years in District No. 1. It is not the apple that is to blame. It was in this district that the first apple orchards were planted, and where the apple reputation of the Province was made, and there is no finer fruit shown at our Exhibition than that which comes from this section; it is highly colored and of splendid flavor and of good size. The finest Baldwins, Spys and Kings I ever saw were grown in this district, but they have one defect that offsets all their virtues as winter export apples: they are not good keepers. The farmers here planted winter varieties more numerously than medium and early varieties, for the reason that even in the early history of orcharding in this Province, there was a surplus of early fruit; consequently, they now find themselves with orchards that are not as profitable as they should be. There is, however, still a possibility of making these orchards valuable assets. Had organization been effected and had intelligence been put into the business, there need not have been a single apple wasted. The remedy lies first in organization into co-operative associations by means of which these apples might be sold during the months of September, October and November. I believe that there is a market for every apple grown there that could be sold before Christmas. There are two markets to which I would draw special attention. First, that of the North-West; I cannot be too enthusiastic about the North-West market for apples. I am prepared to risk my reputation on the statement that this market is opening up faster than we are prepared to supply it. In the past the population has been thinly scattered over a wide extent of territory, and there was not enough at any one point to enable growers to reach them in carload lots. The cost of distributing and other expenses made the fruit so high in price that consumption was nearly nothing. Now, there are hundreds of little stations on the different lines throughout the Western Provinces, each getting a population large enough to take fruit in carload lots. Large warehouses are being established at many points, and they are now taking a carload per week for distribution in many places. At Regina there are two large distributing warehouses, two more have been built at Calgary, and at Lethbridge one of the best in Canada is being opened. It is a splendid concrete building with cold storage and all modern appliances. At Moosejaw, Edmonton, Saskatoon, and other points we shall see a similar development in the next few years, and the person who is in a position to put early apples on the markets of the West is bound to make money.

The early apple market of Great Britain is one that has always been neglected. It has been supposed that we could not sell early apples there if the apple crop in Great Britain was a good one; but, with our present system of cold storage transportation, we can put early apples on that market and can compete with the English grower to advantage, so that we are practically on even terms with him. We have three advantages: first, a better quality of fruit, not better than the best English fruit, which is no doubt ahead of our best, but better than the average run of the commercial orchards of Great Britain; second, it is packed uniformly and honestly; and third, there are large lines of it, which gives it one of the greatest advantages of all over the small lots of English grown fruit. The large English distributing firms would rather handle Canadian apples than the home grown product, because the latter comes in small lots, variously packed and of many varieties. We have the influence of these large brok-

erage firms on our side, and, if we do our share as fruit growers, we shall have our share in the early apple trade of Great Britain.

In evidence given before the Departmental Committee appointed by the Board of Agriculture and Fisheries to enquire into the Fruit Industry of Great Britain, Mr. W. Chambers, a fruit grower in Kent, Eng., said:

"The fruit that is sold there is of a better color than we can under any circumstances produce; for instance, the apples that are brought from America and Canada. We cannot grow such beautifully colored and handsome fruit; I do not think that by any cultivation or management we can come up to the sample that is sent us from abroad."

Mr. Wm. Craze, a fruit grower in Cornwall, Eng., said:

"It appears to me that the success of the Canadian and American apple trade is mainly on two lines, leaving the grading out. First, the barrel is of the same weight practically, whoever it is packed by, and is non-returnable. The second great advantage is that a barrel of Baldwins, Spies or Greenings can be repeated next day, and right through the autumn and winter, whereas in our English apples you get a consignment of forty or fifty bushels to-day, and you say to two or three good buyers, "These are the sort of thing that will suit you," and you may see no more of the same kind that season. The point to put before the growers is that they have too many sorts. There are four or five principal sorts in Canada and America. Three million barrels of apples came to Great Britain this year, principally of five varieties."

Mr. J. W. Dennis, fruit merchant in London, said:

"From a market point of view a great many varieties are bad. The result of it is that as soon as the American and Canadian apples come upon the market the best retailers, who ought to be the best customers for the British fruits, leave them severely alone because they cannot get a continuous supply. The customer finds that a certain apple goes, and he comes back the next day or week and wants the same, and immediately the American and Canadian barrels come in, the shopkeeper will buy them; that is why he leaves the British fruit and takes the Canadian or American fruit."

Mr. Thos. Russell, fruit merchant of Glasgow, in reply to the question, "And you find that the Canadian packing is very good?" said:

"Canadian packing is A1. We cannot get better packing anywhere now. We have a few brands that, on account of the packing, will bring shillings a barrel more than other apples. The Canadian fruit growers are fined if their fruit is found put up not in accordance with the standard. The Canadian Government has inspectors at all the ports and large centres."

I would not speak so confidently of this trade had it not been going on successfully for the last three or four years, during which time some early apples have been shipped every year. This year there was a good crop in Great Britain, and Canadians were afraid to ship early apples there, but the fact remains that prices for early apples were exceedingly satisfactory, and that the market could have absorbed three times as many as were sent.

Here I may say that there is some misapprehension on the part of our growers as to the transportation facilities that have been provided for this early trade. They fail to appreciate the fact that we now have the best system of transportation on the continent of America, if not in the world. At the present time the safest period in the life of the apple is the time it spends in travelling between Montreal and Liverpool or Glasgow. The conditions on board ship are so uniform and the checks so perfect that I see no reason why there should be a breakdown in it. Its reputation is

now well established, and I have no hesitation in claiming that this link in the chain of transportation is now practically perfect.

The refrigerator car service is only fairly well managed. The weakest link, however, in the system is the one from the picking of the apple to the placing of it in the refrigerator car. When the people of District No. 1 learn the value of cooling their fruit before it is put in the package as soon as it is off the tree, and then keeping it cool, there will not be the slightest difficulty in putting our tender fruits on the markets of Great Britain.

With regard to District No. 1, I would advise that in new plantings early varieties, such as the Astrachan, Duchess and, perhaps, the Wealthy, preponderate, as they can catch the high prices at least two weeks ahead of the rest of Canada. If the present orchards of this district, with the late varieties, are vigorous, by all means retain and care for them, utilizing the fruit by selling it immediately on the English market or to the North-West or by doing as they have done in New York State in establishing a system of cold storage in which these winter apples could be placed as soon as they are properly matured. Then they would be on equal terms with the growers of other districts, except that the cold storage would add to the cost of production 25 to 40c. per barrel.

I may suggest here, too, that proper cultural methods will help wonderfully to improve the keeping qualities of the fruit. What is required is to prevent the maturing of the fruit; keep it growing as long as possible. This can be done by making the orchard soil very rich and keeping up clean culture late in the season. Where this was done in cold season with plenty of moisture, such as 1903 and 1904, winter apples stored with little or no loss.

District No. 2 includes the second tier of counties north of Lake Erie, and may be considered in conjunction with District No. 3, which comprises the southern ends of the Lake Ontario counties, that is to say, from the shores of Lake Ontario northward to about as far as the line of the Canadian Pacific Railway, or a little further north in some sections. So far as the climate is concerned, these two groups are very similar. They are the districts in which the winter apple grows to perfection and keeps the longest.

District No. 2 has a peculiar history, as it is a region of small orchards with many varieties, two factors which have a very important bearing on the apple growing industry in the section. In the aggregate there is a large number of bearing trees, but they are scattered over every farm in lots of from two to five acres, each orchard having from ten to fifteen varieties. Along the shores of Lake Huron there are a very few large orchards, but they are rare. This makes it difficult and expensive for the apple operator, and consequently he does not pay a high price for these apples. The reputable and large apple buyers do not find this a congenial field of operation. They have to deal in such small lots and with so many people that the mere burden of buying becomes intolerably irksome as well as expensive. In too many cases the legitimate apple merchant is replaced by the irregular buyer who has neither money nor proper selling connections, but who offers an absurdly low price in the hope that he can turn over his holdings to a regular dealer at a big profit. If he fails in this he repudiates his bargain with the grower, who has no recourse.

The remedy, of course, is to pack and sell co-operatively. Indeed, this is now being done with splendid results. When these have had their time to show their full effects, I confidently expect that there will be no feature of the system of mixed farming that is followed here that will yield such good returns as the orchard.

On the other hand, District No. 3 is a region of large orchards of few varieties where dealers can get large quantities of one or two varieties with comparative ease. Orchards of twenty and twenty-five acres in extent are numerous, while ten acre orchards are quite common. Extending back from the lake front in what is known geologically as the basin of the old Lake Iroquois, is a country that is particularly well adapted to the growing of winter apples. You hear no complaints in this district about apples not paying. Many men here with ten acres of orchard have sold their apples in a lean year for as much as the rest of the products in the one-hundred acre farm were worth. Last year as much as from two to three thousand dollars was paid for the product of some comparatively small orchards. With this district I have included a small section of country adjoining Nottawasaga Bay, an extension of Georgian Bay (3*a* on the map). This territory consists of the north-eastern slope of the Niagara escarpment, which at this point again becomes steep and bold. On the slope of the "Mountain" are found some of the finest orchards in the country, and the section is as favorable a spot for growing winter apples as exists anywhere. I know of no place where apples can be grown to better advantage. Some very large orchards have been planted here which are paying the owners well.

District No. 4 comprises the western midland group of counties, including Perth, Wellington, parts of Grey, Waterloo, etc. (4*a* on the map), and also the Ottawa and St. Lawrence valleys, and the country lying north of District No. 3. The western midland counties may be regarded as the Highlands of Western Ontario, although it is a fact that is not generally recognized as the increase in elevation as you proceed inward from Georgian Bay is very gradual. Nevertheless, it is a fact that at Durham you are 1,100 feet higher than at Goderich. In British Columbia an abrupt elevation of 1,100 feet would give you almost a mountain range, and although it is not so noticeable in Ontario, it makes just as much difference in regard to climate as it does in British Columbia, a difference which has a remarkable effect upon the growing of apples. This district is in reality the watershed of this portion of the Province, and so far as apple growing is concerned, we have to classify it with sections of the Province that are considerably farther north. The tender class of winter apples are not hardy at all points in this region, and are, therefore, not a safe proposition for the orchardists, and my advice to growers would be not to attempt to produce those varieties on a large scale.

So far as the northern portion of the Lake Ontario counties and the St. Lawrence and Ottawa valleys (District No. 4 on the map) are concerned, I cannot recommend the growing of winter varieties. At the same time, there is as great a future here in apple growing as in any of the other districts mentioned. Here is the home of the Fameuse type, including the McIntosh, Wealthy, Scarlet Pippin, etc. The people in this district have the opportunity of developing an enormous dessert trade in these varieties, and these are the ones to which they should devote their attention. There is a large market for these varieties as dessert apples. Boston, New York, Chicago and other large cities will take every apple they can grow. Nevertheless, growers in the district complain that they get only 50c. to $1.00 a barrel for their fruit. My reply is that as they put it up, it is not worth more. To pack these varieties in barrels is simply to spoil their value as a dessert apple, and unless the growers here will produce a dessert apple and pack it properly in boxes, they will never make the greatest success of the business. If, on the other hand, they will learn wisdom, I do not see any reason why there should not be as great and as successful a business in apple growing here as

in any other part of the country. I am not sure, however, that people always do what is in their own best interest under given circumstances.

May I be permitted, then, to sum up generally the situation in the four districts? It is not at all likely that in the Lake Erie counties (District No. 1) there will be any large plantings of winter fruit. In the peach growing districts the land is too valuable and the profits much larger from the tender fruits, peaches, plums, grapes, etc. It would be unfortunate, however, if the orchards which are now in full bearing, well kept and vigorous, should be allowed to deteriorate. The fruit from these orchards can be utilized, as has been pointed out, either by shipping as soon as the fruit is ripe to the North-West or to the English markets; or, what would be more preferable, by establishing a series of cold storage stations where the fruit could be held if necessary as winter shipping stock. This system of cold storage warehouses is particularly commendable because the cold storage facilities are required for the proper shipping of the tender fruits. It will also be required if this district will take up its legitimate business in apples of growing extra early fruit. There appears to be no reason in the world why this southern tier of counties should not supply for the first two or three weeks an enormous quantity of apples that will be in demand before the other sections have ripe fruit. For the proper shipping of this early stock, it will be necessary to have cold storage stations. Therefore, while I would recommend that for new plantings the fruit growers of this district confine themselves very largely to the early varieties, I would at the same time strongly urge a system of cold storage stations that could be utilized not only for the proper shipping of this early stock, but in preserving the product of the present orchards for winter shipping if necessary.

The recommendation for apple growers in District No. 2 would be to confine themselves quite largely for the present to the winter varieties. There seems to be no reason why in certain portions, especially along the shores of Lake Huron, large orchards should not be planted of these varieties; but, presuming that the present system of small orchards with mixed farming is maintained, the salvation of the industry depends upon the formation of co-operative associations. Co-operative associations, of course, would be of very great advantage for every part of Ontario, but for this particular district with those small orchards of many varieties, co-operation is an absolute necessity to success.

For District No. 3 the recommendation would be to continue to plant the large orchards, making a specialty of winter fruit and of orcharding. Speaking generally, farmers here can more easily take up orcharding as a specialty than in other sections. The winter varieties can be recommended here with perfect confidence inasmuch as this district possesses an advantage over every other part of apple-growing North America, and in no contingency that can be imagined can fruit of this class be grown cheaper and better than in District No. 3. The growers in the southern part of the Province as well as in the States south of us, are all at the disadvantage of having to use cold storage which, in addition to adding from 25 to 40c. a barrel to the cost of production, is liable to produce certain losses which are not at all to be feared north of Lake Ontario.

District No. 4 can make orcharding a success on a large scale only by catering to the fancy dessert trade. This the growers of that district can do with the McIntosh and the Fameuse so as to produce a revenue equal to if not greater than anything that can be produced in other portions of the Province. The flavor and keeping qualities of these two apples are such, grown in this section, that they can be boxed and shipped so as to present

an unrivalled appearance when they are placed upon the markets either of the Old Country or of the large cities in our own country or in the United States. A fortune awaits the man who will take up the growing and packing of the Fameuse and McIntosh as a fancy dessert apple.

Speaking of the Province as a whole, one cannot but be impressed with its extraordinary capacity for producing this king of fruits. It possesses within itself almost all the requisites, and it is safe to say that it will take the first place in the markets of the world, as well as in our extensive markets in the North-West, in the production of the best of fruit.

Mr. Rickard, Newcastle: I am very much pleased with Mr. McNeill's address. It has brought forward a number of important facts which it is well for us to remember. He has sized up conditions very nicely and in a way that shows he has a thorough knowledge of the different sections of the Province. I live in one of the best winter apple districts, and there the apple industry is on the increase. In the township of Clark we have from 200 to 300 acres of winter apples within a square mile; and the apple growing industry is there the most important one from the financial point of view, as it means hundreds of thousands of dollars in that section. This money comes largely from across the ocean, as most of our apples go that way, and are likely to continue to do so. We have no fall apples in that section, as they have not been planted, and it may be that some of the winter varieties grown in District No. 1, which come in three weeks earlier than our own, might find a place on our local markets.

MARKETS OF THE NORTH-WEST—TENDER FRUITS.

By Robert Thompson, St. Catharines.

You are doubtless aware that three years ago the government authorized Prof. Reynolds of the Ontario Agricultural College to make an experimental shipment of two cars of fruit to Winnipeg, one from Grimsby and another from St. Catharines. Previous to that time a few spasmodic shipments of from two to five cars in the season had been made. I do not think there was more than that from one town, if we do not include grapes and apples. These shipments were somewhat unsatisfactory on the whole, being sometimes good and sometimes bad. If the market happened to be good at Winnipeg, we got no more than factory prices, and if the market was glutted we had to pay the freight, which happened on more than one occasion. The report of the Government shipments has already been published. Since then the growers in the St. Catharines district have felt that this was a market that should be taken advantage of. We had our co-operative association and our cold storage building, and we decided to try to utilize that market. Therefore the year following the Government shipments, the association sent out in the neighborhood of twenty cars, but the growers who contributed did so at their own risk. If you had asked the opinion of the majority of the growers who took part in these shipments, they would no doubt have stated that they were a failure, but to those who contributed to all or nearly all of the shipments the results were sufficiently satisfactory to induce them to again go into the business this spring. In this year's shipments there has been a great improvement in this respect. It is very gratifying in looking over the names of the shippers to find that from twenty-five to thirty appear in connection with the majority of shipments instead

of only four or five in the year previous, and all the more so when we consider that this year about fifty carloads were forwarded. I think these men will admit that they have been well satisfied with the results.

Coming to the lessons learned, I want first to impress upon you the necessity for co-operation if you intend to take advantage of that market. It is useless for two or three individuals to think that they can send forward a car occasionally and obtain really satisfactory results. The shipments must be continued regularly throughout the season. In making this statement I, of course, refer to mixed fruits. The next point is that in order to receive the best returns from that market, you will have to put your fruit up in the way they want it, and always see that it is shipped in good condition. This necessitates care being taken that it is gathered at the right stage of ripeness and that it is properly cooled before being placed in the cars. In this connection the records of the thermographs in the cars have been very interesting. These the Department at Ottawa placed at our disposal. In cases where the fruit had been cooled to 40 or 45 degrees before being placed in the refrigerator car, the thermograph showed that the temperature dropped within about twenty-four hours to that same temperature, and did not rise above it during the rest of the journey. If, however, only one quarter of the fruit had been cooled previously, it sometimes took sixty hours for the temperature of the car to get down to 40 or 45 degrees, if it got there at all.

Another advantage of co-operation is that you can divide your car between various kinds of fruit, not overloading with any one kind, which was one of the causes of failure in the earlier shipments. One car would carry too many tomatoes, another too many pears, another too many apples for the market to absorb at one time, and low prices resulted. Another advantage is that, where a number are contributing, you are able to load your cars very quickly and to name certain days in each week on which fruit will be received. The growers can then bring in their consignments of fruit on these days, and you are sure of having enough to fill the car. The next advantage is that by co-operating and making regular shipments you can deal with the railway companies on a much more satisfactory basis. If you are prepared to ship 50 or 60 cars, the railway companies will vie with each other in giving you a good service. Another advantage is that an association can get better information as to the market demands than can the individual grower. Nearly all of the larger associations have their own icing station, and are thus enabled to ice their cars twenty-four hours before the fruit is put on board. When it is ready to leave, the car is re-iced.

During the past season a few of us sent consignments of strawberries to the North-West with partial success. The early shipments went through well and commanded good prices. The berries compared favorably with those from British Columbia and Missouri, but were not quite so good as those from the Ozarks or those grown in the neighborhood of Vancouver. The variety called the MacGowan went through in the best shape, but the Williams was the variety chiefly sent, and netted as much as from $2.00 to $3.50 per crate. A few cherries were sent, and they went through in good condition and realized fair prices. In shipping tomatoes we had learned a lesson from the previous years. We found that we had been sending our tomatoes too green, and that they did not want green tomatoes and prices were low. We found that if they could be picked at exactly the right stage, they would arrive in good condition and sell at good prices, but that if sent too ripe or too green, they would not bring within 25 per cent. as much. This year our shipments were very satisfactory and brought us better returns than our peaches. Most of our tomatoes were packed in boxes, but at the

same time it would be a mistake to make a full consignment of fancy grades, as the market requires and is able to take a certain proportion of a second grade article.

In regard to peaches, the weather during the season was unusually dry and hot, and the fruit spoiled much less quickly on this account. As a consequence our peaches shipped better than in years past, and their quality was not altogether owing to packing, etc. The majority of our peaches were packed in boxes, and the price received was better than we obtained at home. They carried almost invariably in good condition. We placed some in every car, starting with Triumph, Early Rivers and following up with Smock, etc.

Q.—What was the size of the box?

A.—They were 20 pound boxes and the fruit was in two layers. There is a good market in the North-West for our pears in part carloads. The report we received from different points was that our pears compared favorably with those from British Columbia, that although they were not quite so large, they were of better flavor and kept somewhat better. British Columbia is not shipping out pears to any extent, owing to the pear blight.

Q.—What variety did you send?

A.—We started with Wilder and finished with Keiffer. I believe that the future of our early apple trade is with the North-West. If they are properly handled, they will realize good prices. In regard to the competition of British Columbia in the North-West market, I came back from my western trip last spring feeling that I was fully justified in advising my neighbors to stay right in Ontario, and that there is a better future before the fruit business in Ontario during the next twenty years than there has been during the past twenty. I do not think we need fear the competition of British Columbia for twenty years to come, and not then in some lines. They can never grow grapes to compete with us commercially, as their nights are too cold. With regard to temperatures, I saw four degrees of frost when plums, pears and peaches were in blossom, and they will admit that they sometimes get it as low as twenty-six below zero during the winter months.

I found that there was a prejudice against some of our fruits at some points in the North-West, but I did not find a dealer from Calgary to Winnipeg who would not admit that he preferred Ontario apples because of their flavor and keeping qualities, provided he could depend on packing. Another thing I found was that they did not want our tomatoes, complaining that they were wormy, etc. I therefore made a shipment early in the season, and asked them to send me back word as to how they compared with western tomatoes. I got a reply by mail that they were the best they ever had had, and to send two shipments a week. In the first car sent to Calgary we placed a certain number of packages of tomatoes, and the moment the car arrived a telegram was sent to us to place 200 boxes in the next car. They had never received tomatoes like those, and my conclusion is that the west cannot compete with us so far as tomatoes are concerned. The only line there is any competition in is in apples, but they have disadvantages in connection with labor, weather, etc., while their country is divided into small isolated valleys where shipment is often a very difficult matter. My conclusion, therefore, is that we are in a better position to place apples on that market than they are, and that we can sell them cheaper and will make more money.

I find that the majority of individual shippers look upon packing in boxes as a bugbear, but where there is an association and a packing house,

the cost is a comparatively small item, as it is quite possible for an experienced hand to pack one hundred boxes per day. You can wrap and box pears and peaches at a cost of from five cents to eight cents a box, provided the work is done on a co-operative basis.

REPORT OF TRANSPORTATION COMMITTEE.

The report of the Transportation Committee was presented by the Chairman, Mr. W. H. Bunting, of St. Catharines:—

There has apparently been some criticism of the committee's work this year, but I think I am justified in saying that the lack of action on their part has been more apparent than real. At the Dominion Fruit Conference in March last the question of transportation was pretty thoroughly discussed and a number of resolutions were endorsed by the conference bearing on this matter, but in the meantime it was felt that some better preparation should be made before taking decisive action in connection with these resolutions. The committee has therefore been gathering data on which to make out its case. Now that the express companies have been placed under the control of the Railway Commission, it is the desire of the committee to prepare a statement of the grievances which we as fruit growers have labored under in the past, in order that our case may be presented to the Commission in such a way as will carry weight and probably secure redress for these grievances. Up to the present time it has been almost impossible to secure any concession from the express companies as they are interested parties, and any representations made to them were pigeonholed, but we now have a tribunal before which any grievances may be laid. On behalf of the committee I should like to ask the members of the Association to tabulate and present to this committee any information they have which they consider would be of assistance in making out a case.

With reference to the general transportation questions by freight and steamship lines, the following resolutions were passed at the Fruit Conference:—

Resolved that the Railway Commission be requested to order:—

(*a*) That a time limit for the transportation of perishable fruits of not less than twelve miles per hour be put in force upon the railways of Canada, which time limit if not maintained shall place the onus of responsibility upon the carrying company if loss or damage is sustained thereby.

(*b*) That when the railway companies fail to furnish suitable equipment for the transportation of fruit within six days after the time an order is placed with the local agent, a penalty be provided for each subsequent day's delay.

(*c*) That icing stations be established at divisional points on all railways engaged in the transportation of fruit, and that cars fully iced be furnished when requested by the shipper.

(*d*) That at all stations where fruit is customarily loaded in car lots, shelter from sun and rain shall be provided.

(*e*) That when requested, shippers of perishable fruit shall be furnished by the local agent with a daily report of the location of a car of fruit while in transit.

(*f*) That a rate for transportation of apples be put in force that shall correspond with the present rate for flour, until such time as the railway companies furnish satisfactory equipment and service.

Resolved that the Dominion Government be memorialized to enact such legislation as will result in placing the express companies operating in this country under the control of the Railway Commission.

That we desire to recognize the value and importance of the assistance rendered by the Dominion Department of Agriculture in improving the conditions prevailing, both with reference to the home and foreign trade, and would request a continuance of these efforts as far as possible.

That copies of these resolutions be forwarded to the Dominion Government, the Railway Commission, and the various railway and express companies interested.

As I have already intimated, the resolution in reference to express companies has received the approval of the Dominion Government and these companies have now been placed under the control of the Commission. In reference to the other resolutions, the committee is still gathering data, and will endeavour to present a case before the Commission which will appeal to its judgment. From my own observations, I am inclined to think that the railway companies have already anticipated some action of this kind. The resolutions I have quoted were considered reasonable and fair to the carrying companies, and we have every hope that the Commission will order that they be put into effect.

PROTECTION OF FRUIT TREES FROM MICE AND RABBITS.

By W. T. Macoun, Horticulturist, C. E. F., Ottawa, Ont.

Every year thousands of trees are injured in Canada by mice, and, in the newer districts, a large number by rabbits also. There could be nothing more discouraging to a fruit grower, or would-be fruit grower, than to see his orchard which he had cared for, perhaps, for five or six years, the trees in which were just beginning to bear, ruined by mice; and yet this frequently happens and the man loses courage, and in many cases, doubtless, does not replant. All this could be prevented if the farmer or fruit grower would use the information which has been published time and again in the newspapers and periodicals, and protect his trees from mice. Some years there is less injury than others, and this fact, like a year when there is no apple spot, leads to carelessness, and when a bad year comes the trees are unprotected.

While the depredations from mice and rabbits in winter vary from one year to another, depending on the scarcity or abundance of food, the number of mice which are in the vicinity, and the character of the winter, the injury is always greatest when the orchard is in sod, and when there is rubbish lying about; hence the latter should be removed before the winter sets in. In most cases it is not necessary or advisable to have the orchard in sod, particularly when the trees are young, although it is highly important to have a cover crop, which is also sometimes a harbor for mice. As mice may be expected in greater or less numbers every winter young trees should be regularly protected against their ravages. Mice usually begin working on the ground under the snow, and when they come to a tree they will begin to gnaw it if it is not protected. A small mound of soil from eight to twelve inches in height raised about the base of the tree will often turn them, and even snow tramped about the tree has been quite effectual, but the cheapest and surest practice is to wrap the tree with ordinary building paper, the

price of which is merely nominal. Tar paper is also effectual, but trees have been injured by using it, and it is well to guard against this when building paper will do as well. Last winter Mr. G. C. Miller, Middleton, N. S., at the meeting of the Nova Scotia Fruit Growers' Association, reported injury to 800 trees from tar paper. It would appear that some brands of tar paper are more injurious than others, as many use it without injury to the trees. After the paper is wrapped around the tree and tied, a little earth should be put about the lower end to prevent the mice from beginning to work there, as if they get a start the paper would not stand in their way. It may be stated, however, that although at least two thousand young trees are wrapped with building paper yearly at the Experimental Farm at Ottawa, there have been practically no instances where the mice have gnawed through the paper to get at the tree. The use of a wire protector, or one made of tin or galvanized iron, is economical in the end, as they are durable.

In the North, protection from sunscald is almost as important as protection from mice. At the Central Experimental Farm we have for several years been using wooden veneer protectors for the standard trees, as these protect from mice and on account of being loose about the tree leave a good air space which appears to protect the tree from those sudden changes of temperature which seem to be the main cause of sunscald. These veneers cost $5 per thousand, and can now be obtained from the Oakville Basket Co., and perhaps from other Canadian firms. As those sold in Canada are only eighteen inches in length, it is necessary to use two for each tree, if it is desired to protect trees from sunscald, although we believe a longer veneer could be obtained if specially ordered.

For the past two winters an experiment has been conducted at Ottawa in painting the trees to protect them from mice. In neither of these winters have the mice been very bad at Ottawa, so that the results so far are not very conclusive as regards protection from mice. It may be said, however, that none of the painted trees were injured by mice, while a few of those left unprotected were injured. It may be stated also that no injury to the trees from the paint has so far been observed. Paint has been used at the Virginia Experiment Station for more than fifteen years with good results, they not having had an apple tree injured. It is not, however, recommended for peaches and cherries as some injury occurred from the use of it on these fruits. If paint is tried it should not be bought ready mixed as it may have some injurious mineral oil. White lead and pure linseed oil should be mixed together to a consistency about the same as for an outside coat on a building. The tree should be heavily coated with this.

There are a number of washes and poisons recommended for the protection of the trees and the destruction of the mice and rabbits, but none of these are very satisfactory, as if the mice or rabbits are numerous the poison has not sufficient effect upon them to prevent injury altogether.

In Manitoba rabbits are very troublesome. The fruit growers there can protect the trunks of the trees when there is a single trunk, but as their trees branch from the ground in many cases it is very difficult to protect them, and to ensure the safety of the trees the whole of the lower part of the tree should be protected and this cannot be done very well except with a spray. We have suggested spraying with paint. That is a good field of work for the new Professor of Horticulture at the Manitoba Agricultural College.

We shall now discuss the question of treating the trees after they have been injured.

If a tree is badly girdled by mice it usually dies. If as soon as the wound is noticed it is cleaned and covered with grafting wax or some paste, such as cow dung and clay, and wrapped with cloth to exclude air and prevent the wood from drying out, there is a possibility of saving the tree if the girdle is a small one, as the sap which rises through the wood will continue to do so, and returning through the inner bark in an elaborated condition will cause growth to be made all around the upper part of the wound, and if the latter be not too large there is a chance of its healing over. If, however, the wood becomes dry before the bandage is put on, the tree will almost certainly die, although it may continue to grow throughout the season. When the wax and bandage are applied the tree should be headed back considerably to lessen the amount of transpiration of moisture, as there will not be as much sap rise as if the tree were uninjured, and the wood will thus dry out sooner than if it were headed back. If the girdle is near the ground, in addition to covering the injured part with wax or cow dung and clay, it is advisable to mound up the soil about the tree to cover the wound and thus help to prevent the wood from drying out.

Girdled trees are frequently saved, and more surely saved than by the above method, by connecting the upper and lower edges of the girdle with scions, which are inserted all around the trunk. The more scions that are used the quicker they will grow together and form a new trunk, but two or three scions successfully grafted on a small tree will carry enough sap to keep the tree alive. The larger the tree the more scions should be used. A slanting cut is made at each end of the wound in the uninjured wood in which the scions are to be inserted. Strong, plump scions of the previous season's growth—not necessarily from the same tree, nor even the same variety—cut a little longer than the distance between the slanting cuts, are made wedge-shaped at each end. They are made a little longer than the distance between the cuts in order that when inserting the ends into the cuts it will be necessary to bend them, and thus have them under pressure, which helps to keep them in position. When inserting, some of the inside bark of the stock should come in contact with some of the inside bark of the scion, as it is here or at the cambium layer where union takes place. As soon as the scions are all placed the wounds, especially about the ends of the scions where inserted in the stock, are covered with melted wax. The ends are also at the same time bandaged with a cloth around the trunk to aid in keeping the scions in place and to exclude the air. The tree should then be well headed back. The scions, if properly made and inserted, should soon unite with the stock and then carry the sap to the top of the tree.

Another method of bridging is to cut back the uninjured bark evenly all round the trunk and insert the wedge-shaped scions underneath the bark at the upper and lower ends of the wound. There are other methods also employed, such as using a scion bevelled at each end. Also, boring holes with an augur at each end in the uninjured bark, and shaping the scion at each end so that it will fit into it. One of the most satisfactory methods of utilizing the girdled tree is to cut it off close to the ground and insert a scion of some good variety. This graft should grow at least three feet in height the first season and make a nice young tree.

Mr. CUTTING: One grower told me that he had obtained good results from the following method: He did a small portion of his pruning early in the winter and afterwards allowed a small pile of twigs to remain on the ground midway between the trees. These acted as a decoy as the mice preferred the twigs to the older wood of the tree trunks.

Mr. ARMSTRONG: I consider that wrapping the trunks with tar paper is the most effectual and cheapest method.

A Member: Grain poisoned with an arsenic solution and scattered around the fences is a good preventive. It should be done in the fall just before freezing up.

Mr. Hilborn: The veneer is cheaper than paper, because it lasts for two seasons and is put on more quickly than the paper. It also protects the trees from severe cold. We get it cut into pieces about 12 x 18 inches and costing $2.50 per thousand.

Mr. W. M. Orr: I have used tar paper on thousands of trees for years with perfect success.

THE STRAWBERRY.

W. F. W. Fisher, Burlington.

To the apple is universally ascribed the title "King of Fruits," no one for a moment questioning its claim to the position. Equally unquestionable is the merit of the Strawberry, the subject of the present address, to the next highest position of rank, namely "Queen of Fruits," large or small, and equally universally is it accorded its true position.

The term small, with its possible double interpretation, is scarcely applicable to the strawberry; it would rather be more correctly applied to the man who does not enjoy the strawberry season. Probably the feelings of every person present would remain unruffled if we were to say that the man who does not appreciate this luscious, delicious, healthful fruit is either pitied or despised by his fellow creatures.

The strawberry is more cosmopolitan in its adaptation to soil, climate and conditions as well as to palates, than any other known fruit. It grows and flourishes in the sunny south, it is found smiling its welcome in the early spring, and in its season tempting the appetite of the dweller on the prairie of the far north, and at practically all points between, it is possible to produce this fruit. Apart from its intrinsic merit, probably one of the joys with which the strawberry is received is due to the fact that it is the harbinger of the season of fresh fruits extending throughout the year, until its own season comes again.

The importation of strawberries from the United States, it was feared by many, would result in weakening the appetite of consumers and lowering the price of the home grown article. The history of demand and average prices for the past ten years shows a contrary effect, and with the increase of importations and the trebling of the acreage under home grown berries, the demand and price have kept full pace.

Now a few words as to cultivation. The old saying that in order to properly train a child one should have begun with its grandmother, applies with full force here: for, if land has been liberally fertilized, and tilled in such a manner as to keep down all weeds for two or three seasons previous to its being planted with strawberries, half the battle has been fought and won: and with ordinary intelligence applied to later operations success is ensured. While, as we have already stated, this fruit will succeed to a remarkable degree on a variety of soils, the ideal one, in the speaker's estimation, is a rich sandy loam with a quicksand subsoil not too near the surface, but still from which a considerable evaporation of moisture is continuous throughout the season of ripening. Having selected the most suitable soil available, it should be well fertilized and fall plowed. Spring cultivation

should begin early in order to retain moisture, and, in cases where the soil is heavy, to keep it from becoming hard. When ready to plant, which should be during the first half of the month of May, plough deep, harrow, and roll firmly.

The choice of varieties depends largely on extremely local conditions and also on the object had in view as to producing berries for the early market or berries of high quality adapted to stand up under long distances of transportation. As in our tree fruits, many growers fall into the error of needlessly multiplying the number of varieties. Choose judiciuosly, and keep the number for a commercial plantation down to two or three. A new and profitable demand will be created as soon as large plantations of single varieties of the right sort are offered to buyers. The plants should be taken from well wintered young beds, and all weak plants discarded, trim off all runners and dead leaves, lay the plants straight in a carrying basket, sprinkle well with water and cover to exclude the air. Then they are ready for the field. Planting should be done as expeditiously as possible after digging.

The distances between rows and between plants depend somewhat on the views of the individual grower, and the habits of the variety of strawberry. Rows are popularly placed at distances from three to four feet apart. We prefer the former for the rows, and from fifteen inches to two feet for the plants in the row. Probably the most common form of planting is for one man to carry a spade in one hand and a basket of plants in the other hand, while another man or boy puts the plants in the holes made by the spade and each presses a foot to the earth at the roots of the plant as they pass on. In this manner an active man and boy will plant about one half an acre per day. As soon as planting is through, they should be cultivated and hoed to retain moisture, and to prevent the air from getting at any roots not entirely covered. After this, cultivation should be frequent, about once a week for the first two months. Early runners should be turned into the row, as they invariably form the strongest plants, and the rows should not to be allowed to become matted by late setting plants. Some of our most successful growers allow each parent plant to set but two young plants on either side, but this system of cultivation called the hedge row, is not general, nor is it conceded that it is, generally speaking, practicable. When the frosts of December come, the rows should be mulched in such a way as to protect the plants from the severity of the winter. The following spring cultivation is again necessary, especially if the plantation is to be maintained for a second year's picking.

Now comes the rub: To get the berries picked carefully, regularly and promptly is the knotty part of the problem. Provision should be made a season in advance for a supply of pickers, and these require a great deal of tact in managing. Picking is done by piece work at the generally uniform rate of one cent per box; but a premium of some kind might be given all pickers who by skill and neatness bring in their berries in the most attractive and saleable condition.

Marketing is the next feature in order, and on the services rendered, rather than on the prices charged, by the transportation companies, depends the success or failure, to a greater or less degree, of all our efforts up to this stage. When the crates are thrown three or four feet by a stupid, careless expressman, and landed in one of the old fashioned stuffy ovens, which are still designated express cars, or when the trains run into market three or four hours late, the result is quite different to that obtained when they are reasonably handled, deposited in a well ventilated car, and delivered at their destination on schedule time.

The distribution of the crop is one of the most important factors, and we think the ordinary grower would do well to confine shipments on commission to the larger centres, and allow buyers at local points to supply smaller markets. If all the mouths in the Dominion are given access to a full allowance of strawberries, we need not fear a glut in future markets.

We have here outlined a system involving a large amount of labor, care and expense. What result should the average grower expect from such a system fairly carried out? Placing the average crop at, say, 7,500 quarts per acre and the average price at 6 cents at railway station, we get thus the sum of $450 as the gross receipts per acre. From this deduct the following charges: Plants required, $25; cultivation, $25; fertilizers, $35; rent, $15; picking, $75; packages, $75: packing and delivering, $25; a total of $275, leaving a net profit of $175, a sum which every intensive cultivator may confidently expect to exceed, and yet which compares favorably with other branches of fruit growing.

Q.—What varieties give you the best results?

A.—If I had not planted any variety except the Williams during the past twelve years, my profits would have been on an average of $1,200 per year greater than they have been.

Q.—You stated that your practice is to have your rows 3 feet apart and 15 in. apart in the row.

A.—Yes, about 3 ft. or 3 ft. 3 in. for weak varieties; for others 3 1-2 ft.

Q.—We find that with 3 ft. rows the plants entirely cover the ground by fall and we cannot continue cultivation.

A.—You should not let your row get that wide. We cut off the runners by cultivating between the rows. Wide rows exhaust the moisture in the soil, and the pickers destroy the plants and fruit when the rows are too wide. A width of about 1 ft. is very satisfactory, or it may be made 15 in. We do not cut off the surplus runners but keep them down by cultivation close to the original plants.

Q.—Would not that throw them into the row and make your row unduly thick?

A.—We try to avoid that by allowing sufficient distance between the plants when we set them out in the spring.

Q.—Did you ever practise cultivating both ways for a time?

A.—Personally I have never done so, but some of the growers do it.

Q.—I practised that method this year with much satisfaction and saved a great deal of expense of hoeing.

A.—We put our plants a little closer together on account of our soil. We do not get as rapid growth on lighter soil.

Q.—How do you handle your beds after picking so as to prepare for the second year?

A.—I regard it as very important that, just as soon after packing as you can attend to it, the patch should be cleaned up. Narrow the rows down pretty thoroughly either with a plow or a cultivator, and work up the ground well between the rows.

Q.—Are you in favor of mowing and burning the plants after the first crop?

A.—I cannot say that I would personally recommend it. Situated as we are where we can get labor, I prefer to hoe them. We have our plants cultivated by the people who do the picking. We can get Indian pickers

from the Grand River Reservation, and when there is no picking to do, they are ready to do the hoeing. We take them on in the spring and keep them through the season, helping us with all our fruits.

REPORTS FROM SHIPPING ASSOCIATIONS.

Burlington Association.

A. W. Peart: We have a good co-operative shipping system which has been in existence for 20 years. I can bear out the testimony of Mr. McNeill as to the efficiency of the service now rendered by the transportation companies. We are getting a good service to Montreal, and only once have we failed in connecting with the boats when we have given the car two days and three nights in which to do it. With us pears are as important as apples for export trade. Our Bartlett pears arrived too green this season, but sold at a fair price. Clapp's pears surprised us by outselling the Bartlett. The Duchess is the only pear that has outsold Clapp's.

Forest Association.

A. Lawrie, Secretary: Our Association has been in existence for about three years, and during that time we have made considerable progress both in the cultivation of our orchards and the production of a good quality of fruit, and also in the shipping of the product to the North-West and the Old Country. We have aimed to get a membership of fruit growers that will take care of their orchards. In this way we secure a quality of fruit that commands a ready sale in the market. This year we have consigned our fruit for the most part to the Old Country, and some returns from our shipments are already to hand. Our first shipments, consisting mainly of Fall Pippins, Ribston Pippins, and Maiden's Blush, netted us $2 for firsts and seconds. Our later shipments we have not definitely heard from as yet. We still have a considerable amount of our product on hand. Our membership this year is about thirty, and an increasing interest is being taken by the members in the care and culture of their orchards.

Newcastle Association.

W. H. Gibson, President: This is our first season and we have a membership of only seven as yet. Our season has been successful financially, and we took the somewhat unusual course of selling our fruit to a dealer. We did so for the reason that the dealer, who was constructing a cold storage building, made an agreement with us, whereby we were to give him our apples, the price arranged for being $2.25. Some of our neighbors who did not belong to the Association did not receive nearly as much. One of our rules was that each member must spray his orchard a certain number of times, and when we came to gather the crop we found that the fruit had been greatly benefited thereby. Where the orchards were thoroughly sprayed, there was not two per cent. of wormy apples, while neighboring orchards had 50 per cent. In one orchard I counted 154 apples on a tree, one-half of which were wormy, and on the ground I counted 170 that had dropped from the same reason. In the Association orchards very few apples had dropped during the season.

Q.—What mixture did you use?

A.—Bordeaux and Paris Green, from six to seven ounces of the latter.

The apples we grow are of the late winter varieties, mostly Stark, Ben Davis, Baldwin, Spy and Russet, apples which to get the best market should be held till late winter or spring. A large number of orchards are being planted in our section and people are very enthusiastic over winter apple growing.

Mr. G. C. Caston, Craighurst: Speaking about spraying, I should like to ask whether anyone here has used Swift's arsenate of lead instead of Paris Green for codling moth. One disadvantage of Paris Green is that it is washed off by rain, and does not remain in sufficient quantities to be always effective. It is claimed for arsenate of lead that it will cling to the tree like glue. It is also claimed that it will not burn the foliage if it is used separately, and it is not necessary to use lime. I should like to hear the experience of growers on this subject.

Mr. Wallbridge, Belleville: I have been troubled with codling moth in my orchard, and Paris Green did not seem to have much effect. I used arsenate of lead for the first time this season. I gave three applications, all being made after the blossoms dropped, and I did not have more than five per cent. of wormy apples. After the trees have been sprayed the leaves seem to show the mixture for some time afterwards, notwithstanding rain. I use three pounds to the barrel, and it costs fifteen cents per pound by the fifty pound keg. I have used it with Bordeaux mixture and also alone.

Q.—Did you use the same quantity when mixed with Bordeaux?

A.—Yes. For the first application I used three pounds to the barrel, for the second two pounds, and for the third one pound.

Secretary Hodgetts: In our power spraying demonstrations we used it at Meaford and had very good success with it, using it along side of Paris Green. It held up better in the Bordeaux mixture and stuck better to the fruit, but we did not see much difference in the results.

Mr. Dempsey, Trenton: I used it this year and could see no difference between it and Paris Green. I found that it gave better results with potatoes than Paris Green.

Oshawa Packers' Association.

Elmer Lick, Sec.: The first object aimed at by our Association was to obtain for the growers what might be considered a reasonable price for their apples. This year on the borders of Pickering Township we had a good opportunity to compare the results obtained by our method of handling and shipping with the customary mode of disposing of the apple crop in the case of two adjacent orchards. One was sold to the buyer at less than fifty cents a barrel for the packed apples; while in the other orchard, which was not composed of such desirable varieties, the grower will net anywhere from $1.30 to $1.70 a barrel for the apples, packed and delivered. This year we have taken fruit from 28 to 30 orchards, comprising 4,800 to 5,000 barrels. So far we have shipped 900 barrels and there will be scarcely any difference between returns received and the price we asked, and we asked a pretty high price for our choice fruit. We have had a little difficulty this year with some of our growers picking their fruit before it was ready. Another difficulty has been the persistent efforts of dealers to buy apples from men in our organization. One dealer made an indefinite offer to one of our members, putting it in this way: "Would you take $600 for the fruit of your orchard?" We shall succeed in getting him a little more than that for his crop. We take care to pack our fruit as carefully and as quickly as possible. We endeavor with fall varieties to pack within forty-eight hours of the time the fruit comes from the grower.

St. Catharines Cold Storage and Forwarding Association.

Robt. Thompson, Pres.: Our company shipped 160 cars during the season, about 60 of them being sold f.o.b. at our station. 64 cars netted a little over $30,000. The majority of the cars we sold to commission men, who expressed satisfaction with this system of buying. Our Association bought 250,000 baskets wholesale, and thus we were fortunate in avoiding the basket famine which afterwards came about. Our spraying materials and supplies were all bought in this way. We obtained one car of boxes from British Columbia for tomatoes, peaches and apples. We like these boxes better than those made here. Not only have they a better appearance, but they hold the nails far better.

Simcoe Association.

Although this is our first year, and we had the usual difficulty in getting the farmers to co-operate, we have a membership of about twenty. We accepted no one as a member who would not spray at least four times. Our experience is that unless our orchards are thoroughly cultivated and sprayed, a good quality of fruit cannot be produced. Many who refused to join our Association last spring are now very sorry, because they are out of pocket by not doing so. We intend erecting a storehouse and also an evaporator in Simcoe to utilize the waste products of our orchards.

Trenton Association.

W. H. Dempsey, Trenton: Our organization is scarcely on a running basis as yet, although we have handled considerable fruit this year. Probably 3,000 barrels of early apples have been shipped to the Old Country and brought very good prices, one consignment bringing $2.55 net. Our winter varieties are in storage at the present time ready for sale or export. It has been very gratifying to the Association to learn from the members that many of them have received so far for their early apples as much as they got for their whole crop in past seasons. We have not made any stringent rules about spraying as yet. Those who do not take care of their orchards will certainly see where they stand, and we have no doubt they will be induced to spray as a result.

Belleville Association.

F. S. Wallbridge: This year we made two consignments of early fruit and obtained from $1.75 to $2 a barrel. We put our other apples in cold storage, and have on hand from 1,500 to 1,800 barrels of Ben Davis, Golden Russet, etc. We prefer to sell our fruit as a rule rather than consign it.

Arkona Association.

We have had great success since our Association was formed by Mr. Sherrington two years ago. The first year we had a membership of eight and shipped only one carload of apples. This year we shipped seven carloads and our returns have been very satisfactory. Early in the season the Department of Agriculture conducted a demonstration in power spraying in our neighborhood, with the result that many are starting to spray their trees.

Mr. A. B. Cutting: Many of you are doubtless aware that a Provincial

association has been formed, known as the Ontario Co-operative Fruit Growers' Association, although its name will have to be changed, as it conflicts with the name of this organization. This is a co-operative movement among the co-operative associations. It is purely commercial in its object and design, and is intended to be a medium through which the local associations may secure reliable information as regards crop prospects, conditions and prices, not only in Ontario, but all over Canada and as far as possible in other countries. The organization will also endeavor to promote better methods of orchard handling, and the formation of local co-operative associations, where these do not exist at the present time.

Mr. G. C. Caston, Craighurst: I desire to take this opportunity of uttering a warning in reference to the fruit trade. I am credibly informed that a certain amount of trash is still being shipped to the North-West from Ontario. The people there are paying as much for it as should secure them good apples. This sort of thing is bound to injure the business and also our reputation with the people there. I am also informed that a great number of apples are being shipped into the Algoma District without bearing any stencil marks on the package. This is a matter to which the attention of the Department at Ottawa should be drawn.

VOTE OF THANKS.

On the motion of Mr. W. H. Bunting, seconded by Mr. G. C. Caston, it was resolved that:

The Association desires to express its appreciation to His Worship, the Mayor, and the Board of Control of the City of Toronto, for so generously granting the Association the use of the rooms in which its sessions have been held.

It was moved by Mr. Thompson, seconded by Mr. Stephens, and resolved that the thanks of the Association be tendered to the directors who are retiring owing to the provisions of the new constitution, for what they have done on behalf of the Association in the past, and to express the hope that, should the future demand it, they will ever be found ready to once more assume the duties of the office.

The President: On behalf of the retiring Board of Directors I can assure you that we appreciate very much the spirit of the resolution you have been good enough to pass. I wish to thank all who have attended our meetings for the deep interest taken in the affairs of the Association. I have been very much gratified at the large attendance, and consider that this has been one of the most successful meetings I have had the pleasure of attending.

APPENDIX "A."

REPORT OF THE HISTORICAL COMMITTEE.

By Linus Woolverton, Chairman, Grimsby.

Preface.

The Ontario Fruit Growers' Association has accomplished so much for the advancement of the industry during the last forty years, that much honor is due to those who organized it and to those who afterward gave their time and talents to the direction of its affairs.

The first president was Judge Campbell, of Niagara, who was elected at the organization meeting held in the Mechanics' Hall, in Hamilton, in January, 1859. This meeting was called at his suggestion, in conference with D. W. Beadle, of St. Catharines, and Mr. George Leslie, sr., of Toronto. There were only eighteen persons present at this first meeting, only one of whom is still living, viz., Mr. A. M. Smith, of Port Dalhousie. In January, 1861, the second annual meeting was held, at which Judge Logie, of Hamilton, was appointed President, and D. W. Beadle, Treasurer. It was soon found best to unite the office of secretary and treasurer, and the two were combined and given to Mr. Beadle, of St. Catharines, who served the Association with distinguished ability until the year 1886, a period of twenty-five years. He was then succeeded by Mr. Linus Woolverton, of Grimsby, who held the position of Secretary-Treasurer, and Editor of *The Canadian Horticulturist* until the year 1902, a period of sixteen years. The work then requiring division, Mr. G. C. Creelman, of Toronto, was made Secretary-Treasurer, and held the position until 1904, when he was appointed President of the Ontario Agricultural College, and gave place to Mr. P. W. Hodgetts, the present Secretary.

While the office of secretary was held continuously by two or three successive persons, that of president has been filled by a long list of worthy gentlemen, who have given direction to the affairs and dignity to the meetings.

CHARLES ARNOLD.

A native of Bedfordshire, England, where he was born in the year 1818, Mr. Arnold removed to Paris, Ontario, in 1833, and twenty years after established the Paris Nurseries. Always busy in the interests of scientific horticulture, he was chosen a director of the Ontario Fruit Growers' Association at its very commencement, a position he held to the day of his death. He was an enthusiastic hybridist, as the many varieties of grapes, apples, raspberries, etc., originated by him, bear witness. In 1872 he obtained a gold medal at the Hamilton Fair, for a new and valuable variety of white wheat; but the most fortunate of his productions in this direction was the American Wonder Pea, for which he received from Messrs. Bliss & Sons, of New York, the handsome sum of $2,000.

The last meeting of our Association, at which Mr. Arnold was present, was in January, 1883, and he was accompanied by Mrs. Arnold. It was on this occasion that he read to us a poem of his own, entitled "A Seat on the Hill-top beneath the old Tree," of which the second stanza runs thus:—

How can I but love thee, thou sacred spot?
And think of the loved ones who were, but are not,
When I view thine old trunk draped o'er with the vine,
The Wood-vine and Pipe-vine thy branches entwine;
And could but those dear ones who planted them there
Sit again by my side these blessings to share;
There's nought in this wide world I'd barter for thee,
My seat on the hill top beneath the old tree.

At the summer meeting following, it was our sad duty to pass a resolution regretting his loss, as that of one who "during his long life labored with great industry to advance the interests of fruit culture in this country, and by his efforts to improve our fruits and grains by cross fertilization, and has, while benefiting his own province, gained a world-wide reputation."

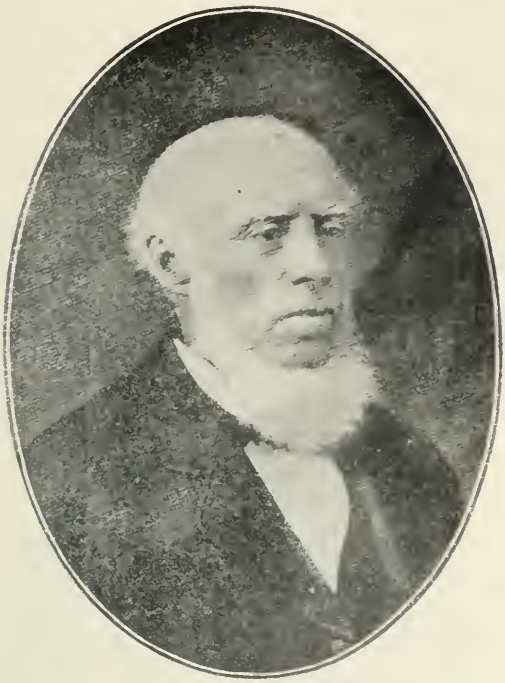
The following valuable notes on Mr. Arnold's labors as a horticulturist, have been contributed by D. W. Beadle, who as Secretary of the Association, had full cognizance of all his work in this direction:—

"Mr. Charles Arnold was, I believe, the pioneer in experimenting in the line of cross fertilization, with the view of producing new varieties of fruits in Canada. His first attempts, as far as is known, were made with the grape. In his first experiments he took for the mother plant a wild vine of, if I mistake not, the Aestivalis family, and impregnated the flowers with pollen of the Vinifera tribe. From the seed thus produced he raised a number of seedlings, some of which seemed to be well worthy of cultivation, which he named Othello, Cornucopia, Autuchon, Brant and Canada. These are fully described in the Bushberg Catalogue of 1883, from which we learn that they were much esteemed in many parts of France. However, they do not seem to have been well adapted to the climate of America, being too subject to mildew and rot. The raspberry received attention from Mr. Arnold, and he raised quite a number of crosses between the Antwerp tribe and a White Cap. None of these proved to be of permanent value, exhibiting often a great tendency to sport back to the original Antwerp. His crosses of the apple have been of more value to us, and one of them, the Ontario, is being grown successfully in many parts of this Province.

Mr. Arnold gave also considerable attention to cross-breeding of wheat, and produced several varieties of that cereal. Whether any of these have proved to be of special value, I am not informed. His greatest success was in the production of cross-bred peas. By crossing the Champion of England with Tom Thumb, he produced a pea having the rich flavor of the Champion of England, and the dwarf habit of the Tom Thumb. This pea has been widely disseminated as the American Wonder, and is yet to be found in some of the seed catalogues.

The above is a brief account of Mr. Arnold's labors in cross-fertilization. He led the way, others have followed; among them the late Mr. W. H. Mills, of Hamilton, and Wm. Saunders, now Director of the Dominion Experimental Farms. Mr. Mills confined his labors to the grape; but Mr. Saunders took in the whole field of fruits in his experiments.

Mr. Arnold thought several of his cross-bred apples worthy of a name, among them being Arnold's Beauty, Ella, Dora, and already mentioned, Ontario."



CHARLES ARNOLD.

DELOS W. BEADLE, B.A., LL.B.

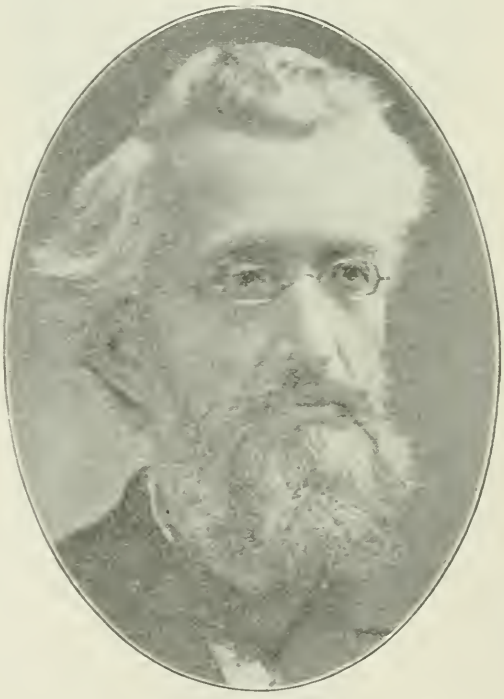
17 October, 1823—30 August, 1905.

During the year 1905 there passed quietly away in the city of Toronto one of two then living constitutional members of the Ontario Fruit Growers' Association, in the person of Mr. Delos W. Beadle. To this gentleman in no small degree, is due the early progress and development of the fruit growing interests of this Province, and some lasting tribute to his ory is justly due from this Society.

Mr. Delos W. Beadle inherited a taste for horticulture from his father, Dr. Beadle of St. Catharines, who was one of our earliest Canadian nurserymen. He was born in that place on October 17, 1823, and was prepared for college at the Grantham Academy, now the St. Catharines Collegiate Institute. In September, 1841, he entered the sophomore class in Yale College, New Haven, Conn., where he obtained his B.A. degree in July, 1844, and two years later he received his B.A. (*ad eundum*) from the University of Toronto. In 1847 he received his LL.B. degree from Harvard University, Cambridge, Mass., and in 1848 he was called to the bar in New York City, where he practiced law for about 6 years. His failing health made it necessary for him to seek an outdoor life. He accepted from his father an interest in the nursery business, in which line he continued until his retirement in 1887.

When the Hon. George Brown began the publication of the Canadian Farmer, Mr. Beadle undertook the charge of the horticultural department and continued to edit it for several years.

In January, 1859, the Fruit Growers' Association of Upper Canada was organized in the City of Hamilton with 18 members. Judge Campbell was the first president, and Arthur Harding, the first recording secretary. On the 16th of January, 1861, Judge Logie of Hamilton, was elected president and D. W. Beadle, secretary, a position which he filled for twenty years with such distinguished ability, that his statements on matters horticultural were everywhere in Canada looked upon as authoritative and reliable. Dr. William Saunders in his annual address, as president in 1884, says of him: "While I acknowledge with pleasure the valuable aid rendered by my much esteemed predecessors in the presidential chair, the lamented Logie, W. H. Mills, Dr. Burnet, and P. C. Dempsey, and esteem it an honor to wear their mantle, I feel free to say with no fear of contradiction, that the Fruit Growers' Association owes its present high position and influence more to its able secretary than to any other man belonging either to the past or to the present."



D. W. Beadle.

At the suggestion of Mr. Beadle, the publication of the Canadian Horticulturist was undertaken in January, 1878, by our Association. His idea was that such a publication would serve to hold together the membership by affording a means of constant intercommunication of ideas, suggestions and experiences in horticulture throughout the round year. As an evidence that Mr. Beadle's abilities were recognized abroad, we may add that on the 10th of November, 1862, he was elected corresponding member of the Horticultural Society of London, England.

In the year 1887, Mr. Beadle sold out his nursery business in St. Catharines to the D. W. Beadle Nursery Company. At the same time he resigned as secretary of the Ontario Fruit Growers' Association and editor of the "Canadian Horticulturist." His most valuable book, "The Canadian

Fruit, Flower and Kitchen Gardener," was dedicated to the President and members of the Ontario Fruit Growers' Association. The rest of his life he spent in Toronto, a student of nature and botanical research until his lamented death, the 30th of August, 1905.

PETER C. DEMPSEY.

More than a hundred years ago Mr. Dempsey's grandfather, a United Empire Loyalist, settled at Albury, Prince Edward County. Fond of fruit culture, he brought seeds along with him, from which he started a nursery,

P. C. Dempsey.

principally of apple trees, some of which are still living and bearing fruit upon the old homestead. Cider was made in large quantities from this orchard in early days, and during the war of 1812 proved a very profitable business, bringing him high prices by the hogshead.

Thus, growing up among orchard trees, Mr. P. C. Dempsey early developed a taste for fruit culture, and in the year 1857, finding the confinement of office work too great for his failing health, he decided to devote his whole attention to horticulture.

Soon after, hearing of the good work being accomplished by the Fruit Growers' Association, he became a member, and was first elected a director in the year 1873. A fluent and pleasing speaker, he was always heard with interest by all in attendance, and honored by his election, in the year 1875, to the position of Vice-President; and in 1880, and again in 1881, to the highest gift in the power of the Society to bestow, viz., that of president.

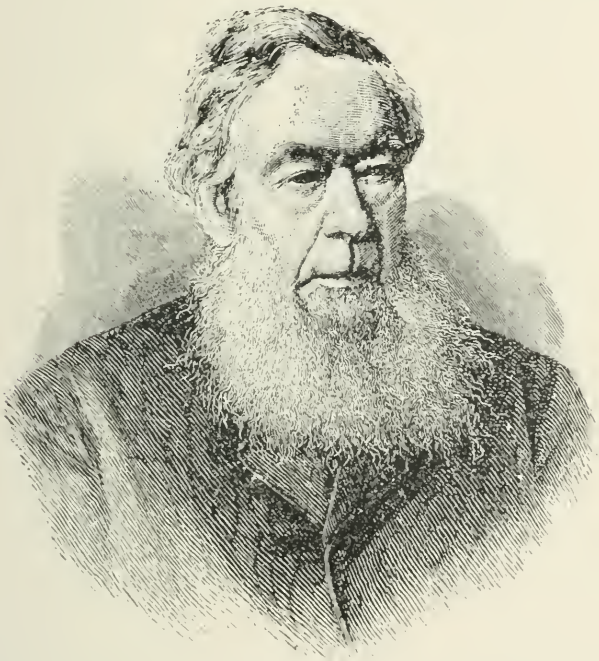
Mr. Dempsey was sent to the Centennial Exhibition, in company with Colonel McGill, of Oshawa, in charge of our exhibit of Canadian fruit, the medals from which are still in possession of our Association; and in 1886 he was employed by the Dominion Government, in company with Mr. A. McD. Allan, to have charge of Canada's fruit exhibit at the Colonial and Indian Exhibition.

Mr. Dempsey's name is deserving of special notice in historic records for his devotion to the art of producing new varieties of fruits by hybridization. This subject was a favorite study with him, and he was successful in giving to us several interesting and valuable fruits; as for example, the Burnet grape, the Trenton apple, the Dempsey pear, and the Dempsey potato. The Dempsey pear is a cross between the Bartlett and the Duchess, partaking of the excellencies of both, and is later in season than the Bartlett. The Trenton apple is a cross between the Golden Russet and the Northern Spy. It has somewhat the appearance of the Fameuse family, but is larger and the color a deeper crimson.

GEORGE LESLIE.

Mr. George Leslie, whose name is associated with the earliest meetings of our Association, was the second son of Wm. Leslie. He was born in Sutherlandshire, Scotland, in 1804. At the age of sixteen he went to Tarlogie, Rosshire, and served an apprenticeship of three years in the gardening profession. He then, under the same proprietor, took charge of the garden, hedges, etc., at Arrabella, where he remained two years. On the first day of April, 1825, being his twenty-first birth day, he with his parents and six brothers and a sister, set sail for America, and after a passage of six weeks landed at Quebec. He immediately obtained employment. In the October following he came to Little York, now Toronto. At that time there were only five brick stores on King Street, all situated east of the market. He at once went to Streetsville, whither his father had preceded him, and chopped in the bush all winter. In the spring he returned to Toronto and entered the service of the late Hon. George Crookshanks, Commissary General. He remained with him one season, and then for several years acted in the capacity of gardener and florist for the late Hon. Wm Allan, father of the Hon. Geo. W. Allan; the late Hon. John Henry Dunne Receiver-General; the late Chief Justice Sir Wm. Campbell; the late Bishop Strachan, and others. In 1830 he purchased, from the Rev. Jas. Beatty the old homestead at Streetsville, previously occupied by his father, a portion of which he cleared and improved. In 1837 he located permanently in Toronto, leasing Russel Abbey Square, bounded by Caroline, now Sherbourne, King, Princess and Front Streets, with all the buildings thereon using the ground for the growing of shrubs, flowers, vegetables, etc. He soon after established himself in business as a grocer and seed merchant His first stock of seeds was brought from London England. In 1838 th

Gas Company erected their works just south of the premises occupied by him, and his store was the first building in the city lighted with gas, crowds coming to view the new illuminant. He subsequently transferred his business to Yonge Street upon the present site of the Bank of Commerce, where he remained until 1845, when the city purchased the property for the purpose of opening up Colborne Street, paying him the sum of $5,000 in corporation debentures. He then leased twenty acres east of the Don river for a period of 21 years, where he began business as a nurseryman, florist and gardener. He subsequently purchased this and adjoining properties to meet the requirements of his business, which increased most rapidly. He was an active member of horticultural and agricultural societies



George Leslie.

for many years, and a life member and director of the Horticultural Society and Botanical Gardens of Toronto. During the 43 years that he was established in business he was awarded at exhibitions many gold, silver and bronze medals, a large number of diplomas and hundreds of other prizes for superiority of productions. In the year 1880 a special silver medal was presented to him by the Agricultural and Arts Association of Ontario. The inscription thereon reads: "To Geo. Leslie, sr., in grateful acknowledgement for his horticultural efforts, by the Council of Agriculture and Arts Association of Ontario." When the first fire company was formed in York he became a member. In 1853 he was commissioned a magistrate by the Hon. Robert Baldwin, the duties of which office he discharged with fidelity. He filled the office of school trustee for nine years and was for one year alderman for the city, but did not seek re-election, not being inclined to neglect his business to engage in political strife.

CHARLES GIBB.

At our summer meeting at Picton, Ontario, in 1888 we had with us a friend of Canadian horticultural who deserves an exalted place in our roll of the fathers of Canadian horticulture. Little did we think, as we climbed the white sand cliffs of Prince Edward County, in his company, that we should soon after hear the sad news of his passing.

Mr. Charles Gibb was born at Montreal on the 30th of June, 1846. He received his early education at Bishop's College, Lennoxville, and went from there to McGill College, Montreal, where he graduated B.A., at the age of nineteen. The application necessary to complete a college course successfully at so early an age, not only injured his eyesight, but also much impaired his health, and he was told by physicians that he had only a few

CHARLES GIBB.

years, perhaps only a few months to live, and they advised him to seek recuperation in foreign travel. This he did, going abroad in company with his uncle, Mr. J. J. Gibb, of Como. This first trip was of two or three years' duration, and embraced visits to Egypt, the Holy Land, and afterwards Switzerland and Europe generally.

On his return he engaged in the cultivation of fruit, in the State of Pennsylvania, no doubt because he rightly considered it one of the most healthful, as well as one of the most interesting departments of agriculture. The climate of Pennsylvania not agreeing with him, he returned to Canada, and purchased the farm on the slope of the Yamaska mountain, at Abbottsford, so well known to us all of late years, on account of the interesting experiments with Russian and other hardy fruits which he has carried out there.

In 1873 he made repeated trips to the United States, studying the pomology of that country, bringing everything worthy of trial to his farm, not merely in sufficient quantities to stock his own farm, but also enough to make free distributions of trees and plants to his neighbors.

In 1882 Mr. Gibb, in company with Prof. Budd of the Iowa Agricultural College, went to Russia in quest of the most hardy fruits which might be expected to endure the extremes of temperature to which the northern parts of Canada and the United States are subject. Prof. Budd had already made a large collection of hardy fruits at Ames, but so little was definitely known of the names and values of the various Russian fruits that it seemed necessary that some one should go to Russia charged with this errand. Speaking of it afterward Mr. Gibb, with his characteristic modesty, said: "Northern horticulturists were looking with great hopes to Russian fruits. The work could not be allowed to rest. Some one must go to Russia; Mr. Budd and I went." On pages 192-230 of our report for 1883, may be seen a full report of this journey, written by Mr. Gibb, who, it is well worth noting, took this costly journey at his own expense. This trip was followed by importations of trees and seeds which were distributed to the members of the different Fruit Growers' Associations of the Province of Quebec, and seeds of which were sent to the Experimental Farm, Ottawa, and to the Botanic Garden at Montreal.

In 1887 he went alone over the same ground, to verify his previous work; visiting in addition, Norway, Sweden and Denmark. Other trips were made in the interests of horticulture to the North-West, British Columbia, California, etc., and in July, 1899, he left for another trip around the world, taking in especially Japan, China, India, and other countries.

Freighted with much valuable information, he was on his way home when his death occurred on the 8th of March following, in Egypt. He contracted la grippe at Aden, which developed into double pneumonia. His remains were interred in the British Protestant Cemetery at Cairo, on the 10th, the funeral being attended by several friends. It was in accordance with his extreme modesty, by which he was especially characterized in life, that he made the request that his funeral would be conducted in a plain unostentatious manner.

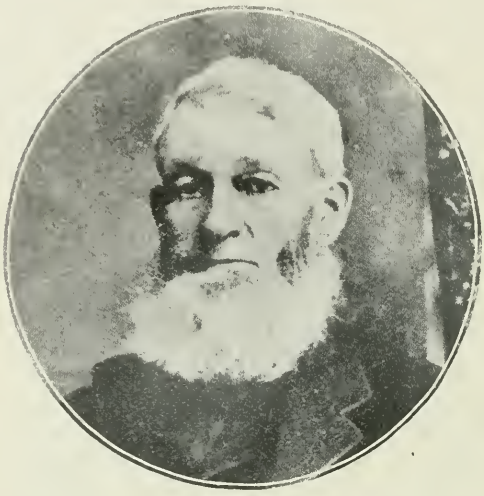
Mr. Gibb's mind was very receptive, his opportunities great, and his memory retentive, so that he was generally looked upon as a bureau of information, which he was always glad to impart, and in consequence his correspondence was very heavy. Since it was so fully in accord with the experimental work in which he had already been engaged at Abbotsford, it is not surprising that he was one of the first and most active workers in the establishment of the Central Experimental Farm, in connection with Prof. Saunders.

JOHN CROIL.

For thirteen years director of our Association for Division No. 1, and most faithful in his attendance and duties, Mr. John Croil deserves a place on our historical records.

He was a native of Glasgow, Scotland, where he was born in the year 1824. He received a good classical education at the Grange Academy, Sunderland, England, and at the age of nineteen came to Montreal, where for four years he engaged in mercantile life; but finding the close confinement unfavorable to his health, he decided upon a country life, and purchased a farm in Osnabruck, situated on the banks of the St. Lawrence, and

built himself a home which he appropriately named "Sunnyside." Here he planted six acres of an orchard, largely of the Fameuse, which became noted as one of the finest in the section, and this, with his garden, gradually engrossed his attention, until of late years. His chief delight was in the pursuit of horticulture. He was a director of our Association from the year 1877 to the year 1890, during which time he has worked faithfully in the



John Croil.

interest of our department of industry. His frequent and spicy contributions to our journal and to our reports are a proof of this statement. Only a short time before his decease, he agreed to give a paper at our Summer Meeting on the "Use of Artificial Fertilizers in the Garden;" but on the 26th of June his work in his terrestial garden ceased, and he was called to take his place among the flowers and fruits of the Celestial garden.

CHARLES EDWARD WOOLVERTON.

One of the eighteen constituent members of our Association, present at the organization in the City of Hamilton, was Mr. Charles E. Woolverton, of Grimsby, Ont. He was born at Grimsby, Ontario, in August, 1820. His father Dennis Woolverton, who farmed about four hundred acres of land, was at one time M.P.P., for the County of Lincoln, and well known as one of the early settlers in the Niagara District. On this farm there was an apple orchard in 1798. When Jonathan Woolverton, Charles' grandfather purchased it, it was of natural stock, and was top grafted about 1828 by an English gardener. I have often heard my father speak of him as "Old Peasley," and that he was a Quaker, and wore a big leathern apron, in the pockets of which he carried his scions.

Among my grandfather's papers, I have found a record of the varieties in his own handwriting, and they were as follows:—

Early French Russet.
Early Harvest (from Queenston).
Rhode Island Yellow Sweet.
Col. Howard's September Sweet.
Pumpkin Sweet.
Pie apple.
Sweet Bellybound.
Large Greening.
Ribston (from England).
Rhode Island Greening.
Snow.
Spitzenberg.
Swayzie Pomme Grise.
Orange Pippin.
Farmers' Long Keeping.
Newton Pippin.
Blue Pearmain.
Crook's Large Sweet.
Holland Pippin.
Large Pippin.

C. E. Woolverton.

Some of these trees are still standing on the old farm, which I have the honor to occupy. One of them, a Greening, now occupies an area of nearly 40 square feet, and in one favorable season, I remember my father, Charles, picking twenty barrels of beautiful apples. He always used a grain bag for apple-picking, tied at the corners, and hung over the shoulder.

From a boy, therefore, Charles was made familiar with the occupations of the farm and the orchard. Often, in his boyhood days, before there was any G. T. R. or C. P. R., he was sent to Hamilton market, a distance of some sixteen miles with wagonloads of peaches or apples, but there was no such thing as an export of fruit, and Hamilton market was frequently glutted.

Charles was given a liberal education at Madison University, in New York State, but his two brothers having taken to the medical profession, he was induced to come home and be the farmer.

About the year 1857, he entered into the nursery business at Grimsby with A.M. Smith, under the title of Woolverton & Smith, and for about fifteen years a large local business was done in all kinds of fruit trees; after which the partnership was dissolved, and the business came into the hands of his son, Linus.

In those early years, Charles was a regular attendant upon the meetings of our Association, held at Hamilton. Of the names of men associated with him, at that time, some idea can be gained from the following extract from one of his magazine articles: —

"When our Association met at St. Catharines we were twice surprised; first at the knowledge of Judge Campbell and Delos Beadle about fruit, climate and soil; and second, at our own ignorance of the fruit we had been handling for a term of years. The genesis of our Association budded in St. Catharines. Judge Campbell was the first life member, but he did not live to see it bloom. Delos Beadle was the Moses of our exodus, leading us out of ignorance into our present fruit bearing stage. The formal organization of our Association elected W. H. Mills, of Hamilton, as President. He was not one of the mills of which it takes ten to make one cent, nor was he a wind-mill to crack corn, but he honored the goddess Pomona, by cultivating fruit and flowers, and at one of our meetings he took us out to see how he raised the finest plums and pears by the sweat of his brow." In this article he refers also to Arnold, Holton, Haskins, Burnet, Saunders, Logie and others. He passed away in September, 1900, at the age of eighty, after an honored and useful life.

APPENDIX "B."

CONSTITUTION AND BY=LAWS.

REVISED CONSTITUTION AND BY-LAWS OF THE FRUIT GROWERS' ASSOCIATION OF ONTARIO.

Preamble.

The objects of the Fruit Growers' Association of Ontario shall be the advancement of the science and art of horticulture in all its branches.

(*a*) By holding an Annual Convention for the consideration of questions relating thereto.

(*b*) By co-operating in every possible way with district and local fruit growers' associations and horticultural societies hereinafter mentioned.

(*c*) By collecting, arranging and disseminating useful information.

(*d*) By co-operating with the Ontario Department of Agriculture in all matters pertaining to the advancement of horticulture.

(*e*) By holding an annual exhibition of fruit and other horticultural products and awarding premiums in conection with the same.

(*f*) And by such other means as may from time to time seem desirable.

Name.

1. This Association shall be called the Fruit Growers' Association of Ontario, and hereafter in this Constitution shall be referred to as the Ontario Association.

Membership.

2. Any person interested in horticulture may become a member by payment of one dollar per annum in advance to the general secretary, or by paying the necessary fee to the secretary of any district or local association in affiliation with the Ontario Association. A single payment of $10.00 to the general secretary shall constitute a member for life.

3. Members of the Ontario Association in good standing shall be entitled to receive regularly the official organ of the Association, a copy of the Annual Report, such other literature as may be sent out by the Association from time to time and any other privileges that may be provided or arranged for by the Association.

4. The Association financial year shall end on the 31st of December.

Annual Meeting.

5. The Annual Meeting shall be held at such time and place as may be designated by the Ontario Association.

Officers.

6. A President, Vice President, Secretary-Treasurer and Directors only shall be the duly qualified officers of the Ontario Association.

7. The Directors shall be elected by ballot at the morning session of the last day of the Annual Meeting, and shall be thirteen in number, representing the thirteen Agricultural Divisions as set forth in Schedule A of this Constitution. The newly elected Board of Directors shall not take office till the second Tuesday in January of the year following, when the report of the retiring Executive and the Treasurer shall be received. Those four Directors who have occupied positions on the Board of Directors for the longest period shall not be eligible for re-election. These Directors shall, however, be eligible for re-election at the end of one year.

8. The newly elected Directors shall at their first meeting appoint from among their number a President and a Vice-President, and also from among themselves or otherwise, a Secretary-Treasurer.

9. The President, Vice President, Secretary-Treasurer and two other members appointed by the Directors shall constitute the Executive Committee of the Ontario Association.

Duties of Officers.

10. It shall be the duty of the President to preside at all meetings of the Ontario Association, decide all questions of order, and make any suggestions he may deem necessary in the interests of the Association. He shall be, *ex-officio*, a member of all committees appointed.

11. In the absence of the President, the powers and duties of his office shall devolve upon the Vice President.

12. It shall be the duty of the Secretary-Treasurer to attend all meetings of the Ontario Association, the officers and the Executive, and keep correct minutes of the same; conduct all correspondence and issue all press and other reports; prepare the report of the Executive Committee for the Annual Meeting; forward the list of representatives to the Secretaries of Fair Associations, also prepare for publication the Annual Report. As Treasurer, he shall receive and account for all moneys belonging to the Association, pay such bills and accounts as have been approved by the Executive. He shall have the power of Managing Director acting under the control and with the approval of the Executive.

13. By virtue of his office he shall be a member of each committee appointed.

14. Before entering upon the duties of his office, he shall enter into a bond, with security when required, which shall be approved of by the Directors.

15. The accounts of the Ontario Association shall be audited by an expert auditor or accountant appointed by the Executive Committee, and approved by the Minister of Agriculture for Ontario.

16. At each Annual Meeting, the retiring executive officers shall present a full report of their proceedings to the Ontario Association. A detailed statement of the receipts and expenditures for the previous year, and of assets and liabilities, a list of members and such information on matters of special interest to this Association as the officers may have been able to obtain, shall be sent to the Minister of Agriculture for Ontario within forty days after the holding of such Annual Meeting.

17. The Executive Committee shall carry into effect the plan of work decided upon by the officers, and shall arrange the details of the same.

18. The officers, or the members of the Executive, or of any Committee may conduct by correspondence, the duties assigned to said officers, Executive or Committee, by the Constitution and By-laws, or by the Association, when such a course is deemed advisable by said officers, Executive or Committee.

19. In case a vacancy occurs in the officers or directorate, the Executive Committee may fill said vacancy forthwith.

Committees.

20. The Association may appoint such committees from time to time as may be deemed expedient, and the first person named thereon shall be declared chairman of each committee.

21.—(*a*) The actual and reasonable expenses of officers and members of committees when attending meetings in the interests of the Association shall be defrayed out of the funds of the Association.

(*b*) The railway fare only of the Directors in attending the Annual Meeting shall be paid by the Ontario Association.

Notice of Meeting.

22.—(*a*) At least two weeks' notice shall be given of each annual and general meeting, naming time and place of meeting. Notice may be given through the public press and by circular letter mailed to each member

(*b*) An officers' meeting shall be called by mailing at least ten days before date of meeting to each officer, a notice of meeting as above provided.

(*c*) Similar notice shall be given to each member of the Executive before an Executive meeting is held.

(*d*) An Executive meeting may be held on shorter notice, provided each officer is otherwise notified and consents thereto.

Quorum.

23.—(*a*) Not less than ten members shall be a quorum to transact business for the Association; not less than five members shall be a quorum at an officers' meeting; and not less than three members shall be a quorum at an Executive meeting.

(*b*) Any member of the Directorate or Executive not present at a meeting, if he send his views in writing, shall be considered as present.

Affiliated Associations.

24. Fruit Growers in any section of Ontario may form a local Association when it has a membership of ten or over, upon the payment to the Treasurer of the Ontario Association of $5.00 for the first twenty-five members or fraction thereof above nine, and twenty-five cents per member for every additional member, which payment shall entitle the members to all the privileges and advantages of membership in the Ontario Association.

25. It shall be the duty of the officers and directors of the Ontario Association to encourage the formation of such local Associations.

26. Fruit Growers who are members of two or more local Associations shall be accepted as members of the Ontario Association from that affiliated Association only which is the first to forward the membership fee to the Secretary-Treasurer of the Ontario Association.

27. Such affiliated Associations may appoint one delegate to the Annual Meeting of the Ontario Association for the first twenty-five members or fraction thereof, and an an additional delegate for every twenty-five members or major portion thereof above the first twenty-five. The actual railway fare of said delegate in attending the Annual Meeting shall be paid by the Ontario Association.

Change of Constitution.

28. This constitution and by-laws may be amended by a majority of members present at an Annual Meeting or a special meeting called for the purpose of considering the same, and of which two weeks' notice shall be given.

Schedule A.—Agricultural Divisions.

1. Stormont, Dundas, Glengarry, Prescott and Cornwall.

2. Lanark North, Lanark South, Renfrew North, Renfrew South, Carleton, Russell and the City of Ottawa.

3. Frontenac, City of Kingston, Leeds and Grenville North, Leeds South, Grenville South and Brockville.

4. Hastings East, Hastings North, Hastings West, Addington, Lennox and Prince Edward.

5. Durham East, Durham West, Northumberland East, Northumberland West, Peterborough East, Peterborough West, Victoria North (including Haliburton), and Victoria South.

6. York East, York North, York West, Ontario North, Ontario South, Peel, Cardwell, and the City of Toronto.

7. Wellington Centre, Wellington South, Wellington West, Waterloo North, Waterloo South, Wentworth North, Wentworth South, Dufferin, Halton, and City of Hamilton.

8. Lincoln, Niagara, Welland, Haldimand and Monck.

9. Elgin East, Elgin West, Brant North, Brant South, Oxford North, Oxford South, Norfolk North and Norfolk South.

10. Huron East, Huron South, Huron West, Bruce North, Bruce South, Grey East, Grey North and Grey South.

11. Perth North, Perth South, Middlesex East, Middlesex North, Middlesex West and the City of London.

12. Essex North, Essex South, Kent East, Kent West, Lambton East and Lambton West.

13. Algoma East, Algoma West, Simcoe East, Simcoe South, Simcoe West, Muskoka, Parry Sound East, Parry Sound West, Nipissing East, Nipissing West and Manitoulin.

APPENDIX "C."

FRUIT PRIZE LIST AT ONTARIO HORTICULTURAL EXHIBITION, 1906.

APPLES.

Class 1. Export or Foreign Market Varieties.

(a) *Barrels ready for Shipment.*

Baldwin: 1st, Chatham F. G. A.; 2nd, Oakville F. G. A.; 3rd, Norfolk F. G. A., Simcoe.
Ben Davis: 1st, Harry Dempsey, Rednerville; 2nd, Chatham F. G. A.; 3rd, Norfolk F. G. A.
Golden Russet: 1st, Robert Thompson, St. Catharines; 2nd, Norfolk F. G. A.; 3rd, Belleville F. G. A.
Greening: 1st, Chatham F. G. A.; 2nd, J. B. Guthrie, Dixie.
King: 1st, Norfolk F. G. A.; 2nd, Oakville Fruit Growers'; 3rd, Belleville F. G. A.
Spy: 1st, Chatham F. G. A.; 2nd, Norfolk F. G. A.; 3rd, Harry Dempsey.
Stark: 1st, Harry Dempsey.

(b) *Standard Boxes ready for Shipment. (Fruit Unwrapped).*

Baldwin: 1st, Chatham F. G. A.; 2nd, Norfolk F. G. A.; 3rd, J. B. Guthrie.
Fameuse: 1st, J. B. Guthrie; 2nd, Norfolk F. G. A.; 3rd, Harry Dempsey.
Golden Russet: 1st, J. B. Guthrie; 2nd, W. G. Watson, Dixie; 3rd, J. G. Brown.
Greening, (Rhode Island): 1st, Norfolk F. G. A.; 2nd, Chatham F. G. A.; 3rd, G. H. Carpenter, Fruitland.
King: 1st, A. Riach, Bronte; 2nd, Bradford Bowlby, Port Dover; 3rd, Chatham F. G. A.
McIntosh: 1st, Norfolk F. G. A.; 2nd, A. D. Harkness, Irena; 3rd, B. T. Boies, Belleville.
Spy: 1st, Chatham F. G. A.; 2nd, B. T. Boies; 3rd, Norfolk F. G. A.

(c) *Standard Boxes ready for Shipment. (Fruit Wrapped).*

Fameuse: 1st, Robert Thompson; 2nd, B. T. Boies; 3rd, W. H. Bunting, St. Catharines.
Gravenstein: 1st, Chatham F. G. A.; 2nd, Robert Thompson; 3rd, Harry Dempsey.
King: 1st, Biggs Fruit & Produce Co., Burlington; 2nd, B. T. Boies; 3rd, J. G. Brown.
McIntosh: 1st, A. D. Harkness; 2nd, Frank Dempsey; 3rd, B. T. Boies.
Northern Spy: 1st, Chatham F. G. A.; 2nd, B. T. Boies; 3rd, Norfolk F. G. A.
Wealthy: 1st, B. T. Boies; 2nd, J. B. Guthrie; 3rd, A. D. Harkness.

Class 2. Domestic or Home Market Varieties.

(a) *Barrels ready for Shipment.*

Blenheim: 1st, A. R. Davison, Danforth.
Ontario: 1st, Harry Dempsey.
Tolman: 1st, Belleville F. G. A.; 2nd, Norfolk F. G. A.
Roxbury Russet: Norfolk F. G. A.; 2nd, Harry Dempsey; 3rd, J. B. Guthrie.
Barrel any other variety not named in Class 1: 1st, Frank Dempsey; 2nd, Belleville F. G. A.; 3rd, Belleville F. G. A.

(b) *Standard Boxes ready for Shipment. (Fruit Unwrapped).*

Blenheim: 1st, J. G. Brown; 2nd, Albert Gilbert, Simcoe; 3rd, A. R. Davison.
Gravenstein: 1st, Robert Thompson; 2nd, Frank Dempsey; 3rd, B. T. Boies.
Ontario: 1st, J. B. Guthrie; 2nd, W. G. Watson; 3rd, Harry Dempsey.
Ribston: 1st, J. B. Guthrie; 2nd, Frank Dempsey.
St. Lawrence: 1st, W. G. Watson, Dixie; 2nd, B. T. Boies.
Any other desirable variety not named in Class 1: 1st, B. T. Boies; 2nd, Ainsley Yeager, Simcoe; 3rd, C. L. Stephens, Orillia.

Class 3. Dessert Varieties, plates of 5.

Fameuse: 1st, J. B. Guthrie; 2nd, W. G. Watson; 3rd, Norman Brown, Eglinton,
Golden Russet: 1st, Newcastle F. G. A.; 2nd, W. G. Watson; 3rd, Henry Pickett, Clarkson.
King: 1st, W. G. Watson; 2nd, B. Bowlby, Port Dover; 3rd, J. B. Guthrie.
McIntosh: 1st, S. N. Culver, Simcoe; 2nd, F. G. Stewart, Homer; 3rd, H. Dempsey.
Wealthy: 1st, H. G. Watson; 2nd, Frank Dempsey, Albury; 3rd, Nelson Forest, Vittoria.
Spy: 1st, W. G. Watson; 2nd, J. B. Guthrie; 3rd, Norman Brown.
Spitzenburg: 1st, Forest F. G. A.; 2nd, Robert C. Fowler, Burlington; 3rd, W. J. Trinder, Simcoe.
Any Other Variety: 1st, A. M. Smith, Pt. Dalhousie; 2nd, C. L. Stevens; 3rd, W. G. Watson.
Seedling. (Any desirable variety): 1st, W. G. Watson; 2nd, F. G. Stewart; 3rd, Frank Dempsey.

Class 4. Cooking Apples, plates of 5.

Alexandria: 1st, Norman Brown; 2nd, J. G. Brown; 3rd, J. B. Guthrie.
Baldwin: 1st, H. Pickett; 2nd, R. C. Fowler; 3rd, W. G. Watson.
Blenheim: 1st, W. G. Watson; 2nd, A. R. Davison; 3rd, J. G. Brown.
Cayuga: 1st, B. Bowlby; 2nd, J. C. Wyckoff; 3rd, W. H. Bunting.
Greening: 1st, F. G. Stewart; 2nd, B. Bowlby; 3rd, J. H. Smith.
King: 1st, S. H. Matheson; 2nd, H. Pickett; 3rd, J. B. Guthrie.
Ribston: 1st, Norman Brown; 2nd, R. C. Fowler; 3rd, H. Pickett.
Spy: 1st, W. G. Watson; 2nd, Norfolk F. G. A.; 3rd, Harry Dempsey.
Any Other Variety: 1st, C. L. Stevens; 2nd, Newcastle F. G. A.; 3rd, Newcastle, F. G. A.

Class 5. Pyramids of Fruit.

Pyramids with a Circular Base of 17 inch diameter, or Barrel Hoop size.

Ben Davis: 1st, W. G. Watson; 2nd, Chatham F. G. A.; 3rd, Newcastle F. G. A.
Baldwin: 1st, J. B. Guthrie; 2nd, W. G. Watson; 3rd, Newcastle F. G. A.
Blenheim: 1st, W G. Watson; 2nd, J. G. Brown.
Gravenstein: 1st, Chatham F. G. A.
Fallawater: 1st, A. R. Davison; 2nd, J. B. Guthrie, 3rd, Chatham F. G. A.
Fameuse: 1st, J. B. Guthrie, 2nd, W. G. Watson; 3rd, Walter Forrester, Rugby.
King: 1st, W. G. Watson; 2nd, J. B. Guthrie; 3rd, J. G. Brown.
McIntosh: 1st, A. D. Harkness, Irena.
Ontario: 1st, W. G. Watson; 2nd, J. B. Guthrie.
Spy: 1st, W. G. Watson; 2nd, William Rickard; 3rd, J. B. Guthrie.
Wolf River: 1st, G. C. Caston; 2nd, Walter Forrester.

PEARS.

Class 6. Plates of 5.

Anjou: 1st, Robert Thompson; 2nd, F. G. Stewart.
Bosc: 1st, A. M. Smith; 2nd, Robert Thompson.
Clairgeau: 1st, S. Baker, Simcoe; 2nd, Robert Thompson.
Diel: 1st, Robert Thompson; 2nd, A. M. Smith.
Duchess: 1st, W. F. Fisher, Burlington; 2nd, Chatham F. G. A.
Hardy: 1st, F. G. Stewart; 2nd, Robert Thompson.
Howell: 1st, A. M. Smith; 2nd, Thomas Delworth, Weston.

Kieffer: 1st, Robert Thompson; 2nd, W. H. Bunting.
Lawrence: 1st, A. W. Peart, Burlington; 2nd, Robert Thompson.
Winter Nelis: 1st, Robert Thompson; 2nd, F. G. Stewart.
Any Other Variety: 1st, John Force, Simcoe; 2nd, A. M. Smith.

Class 7. Export Varieties.

Boxes ready for Shipment. (Fruit Wrapped).

Anjou: 1st, G. A. Robertson; 2nd, Biggs Fruit and Produce Co.; 3rd, Robert Thompson.
Bosc: 1st, F. G. Stewart; 2nd, G. A. Robertson; 3rd, Robert Thompson.
Clairgeau: 1st, Robert Thompson; 2nd, G. A. Robertson; 3rd, F. G. Stewart.
Duchess: 1st, Biggs Fruit and Produce Co.; 2nd, G. A. Robertson; 3rd, Robert Thompson.
Winter Nelis: 1st, F. G. Stewart; 2nd, Robert Thompson; 3rd, G. A. Robertson.
Kieffer: 1st, G. A. Robertson; 2nd, Biggs Fruit and Produce Co.; 3rd, Robert Thompson.
Lawrence: 1st, B. T. Boies; 2nd, G. A. Robertson; 3rd, Robert Thompson.
Any Other Variety: 1st, G. A. Robertson; 2nd, Robert Thompson; 3rd, F. G. Stewart.

GRAPES.

Class 8. Plates and Packages.

Agawam: 1st, F. G. Stewart; 2nd, J. H. Smith, St. Catharines; 3rd, G. A. Robertson.
Concord: 1st, F. G. Stewart; 2nd, G. A. Robertson; 3rd, Robert Thompson.
Lindley: 1st, J. H. Smith; 2nd, Robert Thompson; 3rd, G. A. Robertson.
Niagara: 1st, F. G. Stewart; 2nd, G. A. Robertson; 3rd, W. H. Bunting.
Vergennes: 1st, G. A. Robertson; 2nd, F. G. Stewart; 3rd, Robert Thompson.
Wilder: 1st, Robert Thompson; 2nd, G. A. Robertson; 3rd, J. H. Smith.
Any other variety: 1st, J. H. Smith; 2nd, F. G., Stewart; 3rd, W. M. Robson, Lindsay.
Black Grapes, best 9 pound basket: 1st, G. A. Robertson; 2nd, Robert Thompson; 3rd, F. G. Stewart.
Red Grapes, best 9 pound basket: 1st, G. A. Robertson; 2nd, F. G. Stewart; 3rd, Robert Thompson.
White Grapes, best 9 pound basket: 1st, F. G. Stewart; 2nd, Robert Thompson; 3rd, G. A. Robertson.
Black Grapes, best fancy package: 1st, Robert Thompson; 2nd, G. A. Robertson; 3rd, F. G. Stewart.
Red Grapes, best fancy package: 1st, Robert Thompson; 2nd, G. A. Robertson; 3rd, W. H. Bunting.
White Grapes, best fancy package: 1st, G. A. Robertson; 2nd, Robert Thompson; 3rd, W. H. Bunting.

Class 9. Display of Fruit in Commercial Packages, Exhibited by an Agricultural or Horticultural Society, or Fruit Growers' Association.

1st, St. Catharines Cold Storage and Fruit Growers' Association; 2nd, Norfolk Agricultural Society; 3rd, Grantham Agricultural Society.

For the best display of Fruit not in Commercial packages, exhibited by an Agricultural or Horticultural Society, or Fruit Growers' Association.

1st, St. Catharines Cold Storage and Fruit Growers' Association; 2nd, Norfolk Agricultural Society; 3rd, Grantham Agricultural Society; 4th, Orillia Horticultural Society.

PRESERVED FRUIT.

Class 10. Quart Sealer of Canned Fruit.

Blackberries: 1st, Mrs. W. H. French, Oshawa; 2nd, John Downham, Strathroy; 3rd, Mrs. T. Delworth.
Cherries, Black or Red: 1st, Mrs. R. Thompson, St. Catharines; 2nd, Mrs. F. G. Stewart, Homer; 3rd, John Downham.

Cherries, White: 1st, Mount Pleasant Women's Institute; 2nd, Mrs. R. Thompson; 3rd, Mrs. F. G. Stewart.
Gooseberries: 1st, Mrs. W. H. French.
Grapes, Black or Red: 1st, Mrs. R. Thompson; 2nd Mrs. T. Delworth; 3rd, Miss Lizzie Tasker, St. Catharines.
Grapes, White: 1st, Mrs. F. G. Stewart; 2nd, Mrs. R. Thompson; 3rd, Mrs. T. Delworth.
Peaches, White: 1st, Mrs. R. Thompson; 2nd, Mrs. F. G. Stewart; 3rd, Mrs. T. Delworth.
Peaches, Yellow: 1st, Mrs. T. Delworth; 2nd, Miss Lizzie Tasker; 3rd Mrs. F. G. Stewart.
Pears: 1st, John Downham; 2nd, Mt. Pleasant Women's Institute; 3rd, Mrs. F. G. Stewart.
Plums, Blue or Red: 1st, Mrs. T. Delworth; 2nd, Mrs. R. Thompson; 3rd, Mrs. F. G. Stewart.
Plums, Green or White: 1st, Mrs. W. H. French; 2nd, Mrs. R. Thompson; 3rd, Mrs. F. G. Stewart.
Raspberries, Red: 1st, John Downham; 2nd, Mrs. W. H. Bunting; 3rd, Miss Carrie S. Rush, Humber Bay.
Raspberries, Black: 1st, Mrs. W. H. French; 2nd, Mrs. F. G. Stewart; 3rd, Mrs. R. Thompson.
Strawberries: 1st, Mt. Pleasant Women's Institute; 2nd, Miss Lizzie Tasker; 3rd, John Downham.

Class 11. Pint Jar of Jam.

Currant, Black: 1st, Mrs. R. Thompson; 2nd, Mrs. F. G Stewart; 3rd, Miss Carrie S. Rush.
Grape: 1st, Mrs. R. Thompson; 2nd, Miss Helen McKay, Doncaster; 3rd, Miss Lizzie Tasker.
Peach: 1st, Miss Carrie S. Rush; 2nd, Mrs. T. Delworth; 3rd, Mrs. R. Thompson.
Pear: 1st, Mrs. R. Thompson; 2nd, Mrs. F. G. Stewart; 3rd, Mrs. T. Delworth.
Plum: 1st, Mrs. R. Thompson; 2nd, Mrs. F. G. Stewart; 3rd, Mrs. T. Delworth.
Raspberry: 1st, Miss Carrie S. Rush; 2nd, Mrs. T. Delworth; 3rd, Mrs. R. Thompson.

Class 12. Pint of Jelly.

Apple: 1st, Miss Charlotte E. Shaw, Oakville; 2nd, Mrs. J. W. Sparling, Bowmanville; 3rd, W. H. Stevenson, Oshawa.
Crab Apple: 1st, Mrs. T. Delworth; 2nd, Mrs. A. M. Smith; 3rd, Mrs. J. W. Sparling.
Red Currant: 1st, Mrs. J. W. Sparling; 2nd, Miss Carrie S. Rush; 3rd. Norman Brown.
Grape: 1st, Mrs. J. W. Sparling; 2nd. Mrs. R. Thompson; 3rd. Mrs. F. G. Stewart.
Quince: 1st, Miss Lizzie Tasker; 2nd, Mrs. W. H. Bunting; 3rd, Miss Charlotte E. Shaw.
Red Raspberry: 1st, Mrs. P. W. Hodgetts; 2nd, Mrs. J. W. Sparling; 3rd, Mrs. R. Thompson.
Strawberry: 1st, Mrs. T. Delworth; 2nd, Mrs. R. Thompson; 3rd, Mrs F. G. Stewart.

Class 13. Grape Juice.

1st, Miss A. L. Martin, Toronto; 2nd, Miss Lizzie Tasker; 3rd, Mrs. F. G. Stewart.

Class 14. King Edward Hotel Special Prize.

4 Jars of Fruit: 1st, Mrs. Lewis Vair, Barrie.

COUNTY PRIZE LIST.

Brant.

Baldwin: 2nd, J. W. Clark, Cainsville.
Blenheim: 1st, J. W. Clark.
Golden Russet: 2nd, J. W. Clark.
Greening: 1st, J. W. Clark.
Mann: 1st, J. W. Clark.
Spy: 2nd, J. W. Clark.

BRUCE.

Baldwin: 1st, W. A. Rowand, Walkerton.
Blenheim: 1st, W. A. Rowand.
Fameuse: 1st, W. A. Rowand.
Golden Russet: 1st, M. G. Dippel, Walkerton; 2nd, W. A. Rowand.
Greening: 1st, M. G. Dippel; 2nd, W. A. Rowand.
Mann: 1st, W. A. Rowand.
Spy: 1st, M. G. Dippel; 2nd, W. A. Rowand.

GREY.

Baldwin: 1st, J. I. Graham, Vandeleur; 2nd, A. Gifford, Meaford.
Ben Davis: 1st, A. Gifford; 2nd, J. I. Graham.
Canada Red: 1st, J. I. Graham.
Golden Russet: 1st, J. I. Graham; 2nd, D. Harrow, Vandeleur.
Gravenstein: 1st, J. I. Graham.
Greening: 1st, J. I. Graham.
King: 1st, J. I. Graham.
Spy: 1st, A. Gifford; 2nd, J. I. Graham.

HALTON.

Baldwin: 1st, A. Riach, Bronte; 2nd, G. S. Peart, Burlington.
Cranberry: 1st, G. S. Peart; 2nd, A. Riach.
Golden Russet: 1st, A. Riach; 2nd, G. S. Peart.
Greening: 1st, G. S. Peart.
King: 1st, A. Riach.
Mann: 2nd, G. S. Peart.
Spy: 1st, A. Riach; 2nd, G. S. Peart.
Ribston: 1st, G. S. Peart.
Roxbury Russet: 1st, A. Riach; 2nd, G. S. Peart.

HASTINGS.

Baldwin: 1st, John Aris, Belleville; 2nd, John Graham, Wallbridge.
Ben Davis: 1st, John Graham; 2nd, John Aris.
Fameuse: 1st, John Aris.
Golden Russet: 1st, John Graham; 2nd, John Aris.
Greening: 1st, John Aris; 2nd, John Graham.
King: 1st, John Graham; 2nd, John Aris.
Spy: 1st, John Graham; 2nd, John Aris.
Stark: 1st, John Graham; 2nd, John Aris.
Wealthy: 2nd, John Aris.
Any Other Variety: 1st, John Aris; 2nd, John Graham.

KENT.

Baldwin: 1st, Mrs. A. Dolsen, Chatham; 2nd, J. Johnston, Chatham.
Gravenstein 1st, C. McPherson, Cedar Springs; 2nd, J. E. Hambly, Cedar Springs.
Greening: 1st J. Johnston; 2nd, C. J. Ross.
King: 1st, C. J. Ross.
Spy: 1st, H. McCully, Mull; 2nd, J. E. Hambly.
Stark: 1st, J. E. Hambly.
Wealthy: 1st, G. W. Boley.

LAMBTON.

Baldwin: 1st, Forest F. G. A.; 2nd, Arkona F. G. A.
Ben Davis: 1st, Arkona F. G. A.; 2nd, Forest F. G. A.
Canada Red: 1st, W. A. Broughton.
Fallawater: 1st, W. A. Broughton; 2nd, Forest F. G. A.
Golden Russet: 1st, Forest F. G. A.
Greening: 1st, Forest F. G. A.; 2nd, Arkona F. G. A.
Hubbardston: 1st, Forest F. G. A.; 2nd, W. A. Broughton.
King: 1st, Forest F. G. A.; 2nd, Arkona F. G. A.
Spy: 1st, Forest F. G. A.; 2nd, Arkona F. G. A.

LEEDS AND GRENVILLE.

Baxter: 1st, J. H. Warner; 2nd, Harold Jones, Maitland.
Canada Red: 1st, William Beddie, Prescott; 2nd, W. E. Skinner, Prescott
Fameuse: 1st, William Beddie; 2nd, J. H. Warner.
Golden Russet: 1st, J. H. Warner; 2nd, Ed. Keller, Maitland.
McIntosh: 1st, J. H. Warner; 2nd, Ed. Keller.
Scarlet Pippin: 1st, Ed. Keller; 2nd, J. H. Warner.
Scott Winter: 1st, J. H. Warner; 2nd, Ed. Keller.
Wealthy: 1st, William Beddie; 2nd, Ed. Keller.
Any Other Variety: 1st, J. H. Warner.

LINCOLN.

Baldwin: 1st, F. G. Stewart, Homer; 2nd, W. S. Thompson, St. Catharines.
Blenheim: 1st, W. S. Thompson; 2nd, F. G. Stewart.
Duchess: 1st, W. S. Thompson; 2nd, F. G. Stewart.
Fameuse: 1st, F. G. Stewart; 2nd, W. S. Thompson.
Golden Russet: 1st, C. M. Honsberger, Jordan Station; 2nd, W. S. Thompson.
Greening: 1st, C. M. Honsberger, Jordan Station; 2nd, W. S. Thompson.
King: 1st, W. S. Thompson; 2nd, F. G. Stewart.
Spy: 1st, W. S. Thompson; 2nd, C. M. Honsberger.
Ribston: 2nd, C. M. Honsberger.

NORFOLK.

Baldwin: 1st, Norfolk F. G. A.; 2nd, Albert Gilbert, Simcoe.
Blenheim: 1st, Norfolk F. G. A.; 2nd, Charles Trinder.
Fameuse: 1st, Norfolk F. G. A.; 2nd, Ed. Matthews.
Golden Russet: 1st, Norfolk F. G. A.; 2nd, J. S. Wyckoff.
Greening: 1st, Norfolk F. G. A.; 2nd, B. Bowlby, Port Dover.
King: 1st, Norfolk F. G. A.; 2nd, B. Bowlby.
Spy: 1st, Norfolk F. G. A.; 2nd, Charles Trinder.
Spitzenburg: 1st, Norfolk F. G. A.; 2nd, W. J. Trinder.
Yellow Bellflower: 1st, B. Bowlby; 2nd, D. Wintermate.
Any Other Variety: 1st and 2nd, Norfolk F. G. A.

NORTHUMBERLAND AND DURHAM.

Alexander: 1st, D. J. Gibson, Newcastle.
Baldwin: 1st, Frank H. Hall; 2nd, Newcastle F. G. A.
Ben Davis: 1st, P. C. Dempsey; 2nd, D. J. Gibson.
Fameuse: 1st, Ed. Hanna, Janetsville; 2nd, D. J. Gibson.
Golden Russet: 1st, P. C. Dempsey; 2nd, F. H. Hall, Wicklow.
Greening: 1st, D. J. Gibson; 2nd, P. C. Dempsey.
King: 1st, Newcastle F. G. A.; 2nd, P. C. Dempsey.
McIntosh: 1st, E. C. Beman, Newcastle.
Spy: 1st, William Rickard, Newcastle; 2nd, P. C. Dempsey.
Wealthy: 1st, E. C. Beman; 2nd, P. C. Dempsey.

ONTARIO.

Baldwin: 1st, R. W. Grierson, Oshawa; 2nd, Enos Remmer, Pickering.
Ben Davis: 1st, Walter McGregor, Whitby; 2nd, W. H. Stevenson, Oshawa.
Fameuse: 1st, W. H. Stevenson, Oshawa.
Golden Russet: 1st, W. H. French, Oshawa; 2nd, W. H. Stevenson.
Gravenstein: 2nd, Gervais Cornell, Pickering.
Greening: 1st, W. H. Stevenson; 2nd, Enos Remmer.
King: 1st, W. H. Stevenson; 2nd, Gervais Cornell.
Spy: 1st, R. W. Grierson; 2nd, W. H. French.
Any Other Variety: 1st, W. H. Stevenson; 2nd, Walter McGregor.

OXFORD.

Baldwin: 1st, J. C. Harris, Ingersoll; 2nd, E. M. Hersee, Eastwood.
Ben Davis: 1st, J. C. Harris.
Fameuse: 1st, E. Hersee; 2nd, J. C. Harris.
Golden Russet: 1st, E. Hersee; 2nd, William Newton, Woodstock.
Greening: 1st, R. W. Newton; 2nd, Andrew McKay, Woodstock.
King: 1st, R. W. Newton; 2nd, M. G. Schell, Woodstock.
Spy: 1st, J. C. Fullick, Woodstock; 2nd, J. C. Harris.

Seek: 1st, J. C. Harris; 2nd, Andrew McKay.
Tolman: 1st, J. C. Harris; 2nd, M. G. Schell.

PERTH.

Baldwin: 1st, J. O. Coles, Munro.
Blenheim: 1st, J. O. Coles.
Ben Davis: 1st, J. O. Coles.
Cranberry: 1st, J. O. Coles.
Golden Russet: 1st, J. O. Coles.
Greening: 1st, J. O. Coles.
King: 1st, J. O. Coles.
Spy: 1st, J. O. Coles.
Seek: 1st, J. O. Coles.
Any Other Variety: 1st, J. O. Coles.

PRINCE EDWARD.

Baldwin: 1st, Harry Dempsey, Rednerville; 2nd, Frank Dempsey.
Cranberry: 1st, Harry Dempsey; 2nd, Frank Dempsey.
Fameuse: 1st, Frank Dempsey; 2nd, Harry Dempsey.
Gano: 1st, Frank Dempsey; 2nd, Harry Dempsey.
Golden Russet: 1st, Harry Dempsey; 2nd, Frank Dempsey.
King: 1st, Frank Dempsey; 2nd, Harry Dempsey.
McIntosh: 1st, Frank Dempsey; 2nd, Harry Dempsey.
Spy: 1st, Harry Dempsey; 2nd, Frank Dempsey.
Stark: 1st, Frank Dempsey; 2nd, Harry Dempsey.
Wealthy: 1st, Harry Dempsey; 2nd, Frank Dempsey.

EAST SIMCOE.

Alexander: 1st, W. Forrester, Rugby; 2nd, D. Cotton, Orillia.
Baxter: 1st, C. L. Stephens, Orillia.
Fameuse: 1st, C. L. Stevens, Orillia; 2nd, Walter Forrester, Rugby.
McIntosh: 1st, C. L. Stevens; 2nd, G. Hewett, Ardtrea.
Golden Russet: 1st, C. L. Stevens; 2nd, R. H. Jupp.
King: 2nd, C. L. Stevens.
Spy: 2nd, C. L. Stevens.
Any Other Variety: 1st and 2nd, C. L. Stevens.

STORMONT, DUNDAS AND GLENGARRY.

Alexander: 1st, Andrew Harkness, M. D., Lancaster.
Baxter: 1st, Andrew Harkness, M. D.; 2nd, A. D. Harkness, Irena.
Fameuse: 1st, A. D. Harkness; 2nd, J. D. Campbell.
McIntosh: 1st, Nicholas Everetts, Iroquois; 2nd, A. D. Harkness.
Northwest Greening: 1st, Andrew Harkness, M. D.
Scott Winter: 1st, A. D. Harkness; 2nd, J. D. Campbell.
Wealthy: 1st, J. D. Campbell; 2nd, A. D. Harkness.
Wolf River: 2nd, J.D. Campbell.
Any Other Variety: 1st and 2nd, A. D. Harkness.

VICTORIA.

Alexander: 1st, W. M. Robson, Lindsay; 2nd, Thomas Beall, Lindsay.
Fameuse: 1st, Thomas Beall; 2nd, W. M. Robson.
Golden Russet: 1st, Thomas Beall; 2nd, W. M. Robson.
McIntosh: 1st, W. M. Robson.
Spy: 1st, Thomas Beall; 2nd, W. M. Robson.
Wealthy: 1st, W. M. Robson.
Yellow Bellflower: 1st, Thomas Beall; 2nd, W. M. Robson.

YORK.

Alexander: 1st, J. G. Brown.
Blenheim: 1st, S. H. Matheson; 2nd, J. G. Brown.
Fameuse: 1st Charles Plunkett, Woodbridge; 2nd, M. W. Robertson, Kettleby.
Golden Russet: 1st, Charles Plunkett; 2nd, J. G. Brown.
Greening: 1st, J. G. Brown; 2nd, A. R. Davison.
King: 1st, M. W. Robertson; 2nd, S. H. Matheson.
McIntosh: 1st, M. W. Robertson; 2nd, A. R. Davison.
Spy: 1st, A. R. Davison; 2nd, J. G. Brown.
St. Lawrence: 1st, Charles Plunkett.

APPENDIX "D"

SAN JOSE SCALE.

OUTLINE OF WORK PERFORMED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, 1897-1907.

By W. B. Varley.

The existence in the Niagara District of the San Jose Scale was first brought to the attention of the Department early in 1897 through the Ontario Fruit Growers' Association. Mr. W. M. Orr, who was in charge of the experiments in spraying for the Department at the time, was directed to ascertain the extent of the infestation. A bulletin was prepared by the Professor of Biology, at the Ontario Agricultural College, describing the insect, and the methods of treatment by whale-oil soap wash, kerosene emulsion, resin washes, etc. (See p. 11, O. A. C. Report, 1897). Mr. Orr in his report (file 8840), dated October 28, 1897, stated "I have located fruit trees from infested nurseries in New Jersey at 85 points in the Province extending from Ottawa to Chatham and Leamington." Inspector Orr was thereupon instructed by the Minister to follow up this nursery stock and destroy it "on the spot," if scale were found to be present; the object being to "entirely stamp out the pest if possible." In November of the same year Mr. Orr reported that he had found scale in six orchards in Essex county; that "thousands of trees were infested and that many would have to be burned." In his reply, the Minister referred to the fact that American authorities were advocating spraying treatment and he expressed the fear, based on the difficulty that existed in inducing farmers to spray for other pests, that if treatment were resorted to it would, in the end, result in the infestation spreading wider and wider year by year.

At the Session of the Legislature, 1898, an Act was passed entitled "An Act to Prevent the Spread of the San Jose Scale." This Act provided that all plants found to be infested with San Jose Scale should be cut down and destroyed by burning, and that compensation, not exceeding one-fourth of the value of the plant destroyed (not including fruit), should be paid.

At about this time a deputation from the Ontario Fruit Growers' Association waited upon the Minister of Agriculture at Ottawa, and as a result of their representations, provision was made for the thorough fumigation under Government inspection of all imported nursery stock, and its entry was restricted to certain points on the boundary of the Province. A very vigorous policy was then entered upon; a large inspection staff was organized with G. E. Fisher, of Freeman, as Chief Inspector, and an effort made to locate all infested orchards in the Niagara District, and in Essex and Kent, and destroy infested trees. In the year 1898, $12,911.86 was expended on the work of inspection, $6,231.00 for compensation, and $146.00 for printing bulletins, etc., a total of $19,290.00. The inspection work was confined to trees that had been planted for five years or less in the counties of Halton, Wentworth, Welland, Lincoln, Essex, Kent and Elgin. This work developed the fact that the scale had been present in the Province for at least seven years. It was also discovered that during the previous spring stock from infested Ontario nurseries had been sent to nearly every county in the Province and planted.

Under the Minister's instructions, the Inspector procured a list of the sales, and as a result stock from these nurseries was located at 100 different points in the Province, and the trees destroyed. The Inspector was then instructed to make a thorough examination of nurseries, and seven of them were found to be infested. The infested stock was destroyed.

While this work was progressing, deputations from Niagara and Essex waited upon the Minister, protesting against the destruction of trees. In the west, the greatest antagonism was aroused. In some instances attempts were made by force to prevent inspectors gaining admission.. Public opinion finally compelled the Department to desist from the work of destruction, and as a result the scale again made rapid headway.

During this time the nurseries were inspected by three of the professors of the Ontario Agricultural College, and the work of fumigating the stock with hydrocyanic acid gas was inaugurated.

During 1899, $15,786.00 was spent on inspection of orchards; $10,603.00 in compensating owners; including everything, the total cost of the work that year being $27,770.50.

Owing to the protests made by owners of orchards, and to the fact that the scale was much more widespread, and much longer established than was supposed at the inception of the work, and that it existed in Ontario nurseries the Minister concluded to appoint a commission to discuss matters with the growers. Dr. Mills of the O. A. C., John Dearness, of London, and W. H. Bunting, of St. Catharines, conducted the enquiry. Their report recommended that opportunity should be given growers to treat their trees in place of destruction by burning. Accordingly in the spring of 1900, an amendment was passed to the San Jose Scale Act, (63 Vic., c. 46, s. 2):—

(1) Permitting the adoption of regulations for the treatment of infested plants by spraying;

(2) Prohibiting the removal of nursery stock from a nursery unless the same had been fumigated.

From then on the compulsory destruction of trees was discontinued, and the work took the form of investigating remedies, apparatus for spraying, indentifying the scale for growers, instructing them in the preparation and application of the mixtures recommended, superintending the fumigation of nursery stock, supplying growers with spraying materials at one-half cost. These materials consisted chiefly of whale-oil soap and crude petroleum. The results of the experiments were published, and efforts were made by the Department to arouse growers to the seriousness of the infestation, and as to necessity for prompt measures to keep the scale in check. Great indifference was at first encountered, but in the Niagara District this gradually gave way to a due appreciation of the situation.

During the year 1900, $7,112 was expended on the San Jose Scale work. This included an extra allowance made to certain growers in Kent County, whose trees had been destroyed, and who were greatly dissatisfied at the amount they had previously received.

At the Fruit Growers' meeting in the autumn of 1900, Professor Lochhead said as follows:—"The Government should pass a measure which would compel the owners of orchards either to spray their trees or to pay for the spraying of the trees when done by the Government."

In 1901, the work, as outlined in 1900, was continued, the sum of $4,250 being expended.

In the autumn of 1901 the Fruit Growers' Association passed a resolution, (Report of the O. F. G. A., 1901, p. 25), which led to the following amendments being made to the Act at the session of 1902:—

(1) That a municipality might appoint local inspectors to enforce the provisions of the Act, and that upon the petition of fifteen or more ratepayers they were compelled to appoint said inspector, the Department paying one-half the remuneration of said inspector.

(2) Requiring owners of orchards to effectually treat their trees with the remedies set forth in the Act, or prescribed by the Department, or else to destroy same by fire, subject to the penalties prescribed by the Act.

The effect of this amendment was to place the onus of inspection on the municipalities interested, the work to be performed under the general direction of the Department through the Chief Inspector.

In 1902, the work already indicated was continued at an expenditure of $7,237 for the year, including $375 additional compensation to certain growers in Kent.

At the Fruit Growers' Convention in the autumn of 1902, the Chief Scale Inspector recommended the use of the lime-sulphur wash, with which he had previously conducted experiments for two years, as being cheaper, safer and more effective than any other remedy. Articles and bulletins explaining this remedy were published and distributed by the Department, practical demonstrations were continued, and sulphur was added to the list of spraying materials supplied at a reduced cost.

In the autumn of 1903, Professor Lochhead made the following statement at the Entomological Convention:—"Never before has the San Jose Scale problem seemed so easy of solution as it is to-day. After long experimentation we now know that we have methods which are both effective and easy to apply. The whole solution of the difficulty lies now with the fruit grower himself." (p. 42, Entomological Society Report, 1903.)

In 1903, $3,712 was expended in the work. The Department at this time agreed to supply spraying materials at wholesale rate, and to pay the freight thereon, instead of at half cost.

In 1904, the amount expended was $4,281.

The orchard inspection staff was now discontinued, it being left in the hands of the municipalities to carry on the work. Inspector Fisher retired, and his Assistant, J. Fred Smith, of Glanford, took his place, being employed casually by the Department as occasion required.

In April, 1905, Inspector Smith was instructed to visit the County of Kent and report on the conditions prevailing. He reported that the infested area comprised the whole of the township of Harwich, the southwestern half of the township of Howard, and that it was spreading westward to the township of Raleigh. It was in the township of Harwich that seven original areas of infestation were located in 1899, and from these the scale had since spread. During the intervening six years, he stated that it had spread on an average a distance of three miles. He further reported that the feeling of the owners continued to be for the most part one of indifference, as it had been from the first, the people stating that for the past five or six years at any rate, the apple crop had not been worth the picking. The fruit being of no value it was impossible to make the people feel any interest in their orchards. This feeling was accentuated because of the fact that so many were making money out of beans, corn, wheat and pork. He stated that along what was known as the "ridge," however, there were some very fine orchards and the people were selling lots of fruit. Likewise in the Chatham section a co-operative fruit association had been organized with

upwards of twenty farmers as members. This company had purchased a power sprayer, and was spraying the orchards of the members.

He further stated that the prevailing view was that the Department should purchase a number of power machines, put them in charge of spraying gangs, and spray all orchards, charging the owners pro rata for the work.

With the conclusion of the spraying season of 1905, the distribution of spraying materials at cost was discontinued.

In May, 1905, the inspector was instructed to inspect orchards in the vicinity of St. Thomas, Courtwright and Sparta, in Elgin County. These were original points of infestation. In a hurried inspection he failed to find scale outside of the original orchards, but in them he found plenty of scale. He endeavored to induce the owners to treat.

In May, 1906, H. P. Jeffrey, of Blytheswood, the local inspector for the township of Mersea, in the County of Essex, reported the existence of scale in some 19 orchards at Leamington and Blytheswood, but that he had not been over half the fruit district. He stated that the owners were disposed to treat their orchards, and had already made a beginning in that direction. Inspector Jeffrey called attention to the fact that some of the farms on which scale was found were untenanted. The chief inspector was sent into the district, and Mr. Jeffrey afterwards wrote the Department that he (the Chief Inspector), had been of great help in stirring up the farmers to take action.

In October, 1906, a new infestation was reported in the vicinity of Tillsonburg, in Oxford County, near the borders of Elgin and Norfolk. The Inspector was sent and found one orchard badly infested, and 7 others slightly infested. He reported that the people expressed a willingness to try to save their orchards.

In January, 1907, on account of several requests for assistance having been sent to the Department, a series of meetings was arranged in East Kent, to secure information on the situation, and if possible to devise a means of coping with it. The delegation consisted of Chief Inspector Smith, and Joseph Tweddle of Fruitland. They held meetings at Ridgetown, Guilds, Blenheim, Kent Bridge, Eberts and Chatham. They informed the people that the Department was prepared to place a spraying outfit in the district, and spray at a cost to growers of 10c. per tree, if such a course met with approval. At four of the six meetings no resolution was passed asking for any assistance. At Guilds, a resolution was passed in opposition to the Department doing anything; and at Blenheim, the same feeling was freely expressed. On the other hand, at Ridgetown and Chatham, resolutions were passed asking for assistance. The Ridgetown resolution asked for a power sprayer to operate at a nominal cost to growers. The Chatham resolution asked the Government to appropriate a sum to investigate parasitic enemies of the scale and codling moth, and to conduct experiments with the various proprietory remedies offered to the public for the treatment of scale, with a view to securing an efficient, cheap and easily applied remedy.

As to the state of the orchards, the commissioners reported that the orchards at Ridgetown, Blenheim and Guilds were largely past redemption, and that owners there did not seem to think it worth while for the Government to do anything in the matter. At Chatham, Kent Bridge and Eberts, conditions were different, and the people seemed disposed to treat their trees or have the Government do so for them on the basis mentioned, as in those sections there had been no serious loss of trees. At Kent Bridge a co-operative association was formed at the meeting.

In the Township of Mersea, in the County of Kent, four inspectors have this year been appointed to deal with the situation.

The foregoing will give a general idea of the conditions prevailing in the scale areas of the western district at the present time.

In the Niagara District, owing to the efforts of the Department, and the importance of the interest at stake, growers have been thoroughly aroused to the importance of fighting the scale. They are now doing so pretty generally, and have been for some time past.

In 1906, the scale was reported near Effingham, in the township of Pelham, and the Inspector was sent to report on the situation. He found scale at several points in the neighborhood. The Minister urged the municipal authorities to appoint a local Inspector to carry out the provisions of the Act, which they afterwards did. The adjoining township of Thorold also appointed an Inspector shortly afterwards.

It will be observed from the foregoing that the conditions prevailing in the County of Kent are peculiar to the district, that is to say, the farmers are not for the most part making any money out of their fruit, and therefore are indifferent. The question arises what should the Department do under these special circumstances to cope with the situation.

The facts are these:—

1. The majority of the growers will not treat their trees.

2. Many of the trees cannot now be saved by treatment; others are too large to be properly treated. On the other hand there are areas where the trees are less infested where they can be saved by prompt treatment, and where the owners are anxious for the Department to help them.

3. That if systematic action is taken, the spread of the pest may be stopped, both there and at Tillsonburg and St. Thomas, and thousands of trees saved that are not yet infested beyond redemption.

The suggestion is made that the Department should operate a number of power sprayers in the district, and treat all trees at a nominal cost. This would entail a large outlay to operate, materials, etc. The spraying season is short and more than one outfit would be needed to cover the ground. The work must be efficiently done, and the Department finds great difficulty in securing the services of men who are competent to perform it. Then the question arises, how are men who do not want their trees treated, and who will pay nothing for treatment, to be dealt with? Their trees should be sprayed in the common interest; so should the infested trees on untenanted farms, or they will remain a source of infestation for treated orchards.

If this work is once undertaken, it will have to be continued from year to year, as treatment does not eradicate the pest, at least not unless followed up thoroughly for a number of seasons.

Having undertaken the work in the west, the Department would have to be prepared, as Inspector Smith points out, to conduct similar operations throughout the Niagara District, which would mean going into the business on a very large scale. It would probably call for the employment of a Superintendent who would take exclusive charge of the whole matter, thoroughly organize the work, and follow it up systematically from year to year.

The matter of the introduction of parasites for scale and codling moth has not been touched upon, but it may be stated briefly, that investigations undertaken in the United States at great expense conclusively show that no assistance is to be looked for in this direction at the present stage in combatting these pests.

So far as the investigation of new remedies is concerned, the Department has made and will continue to make experiments with them. To this end the Department keeps in touch with developments in the United States, and with the experiments that are being conducted there.

The part that the local co-operative Associations are playing in combatting the codling moth, the San Jose Scale and other insects destructive to fruit and fruit trees, should not be overlooked in this connection. These Associations are being organized throughout the Province, at the instigation of the Department through the medium of the Ontario Fruit Growers' Association, with which they are affiliated. They have for their object the co-operation of their members in the packing and marketing of their fruit. Twenty-eight have been organized up to the present. In some instances, notably at Chatham and Newcastle, the Associations have power spraying outfits, and charge the members with the work done. Other Associations make spraying by their members, one of the rules of membership. Owing to the fact that these Associations are making the business of fruit growing much more profitable, no difficulty is experienced in getting the spraying done by their members. It is felt that the extension of these Associations and the results they are demonstrating as to the value of spraying will do more to arouse the public to spray than any demonstrations conducted by the Department, and more than any compulsory law on the Statute book could possibly accomplish.

The following municipalities have appointed Township Scale Inspectors:

	No.		No.
Saltfleet (Wentworth)	2	Thorold (Welland)	1
North Grimsby (Lincoln)	3	Clinton (Lincoln)	2
Louth (Lincoln)	1	Barton (Wentworth)	1
Pelham (Welland)	1	Mersea (Essex)	4

TORONTO, March 11th, 1907.

APPENDIX "E"

A BRIEF STUDY OF THE PEACH INDUSTRY.

By Alden Blair Cutting, B.S.A., "Canadian Horticulturist," Toronto.

The purpose of this article is to offer for the consideration of growers and all persons interested in the peach industry, some ideas gained by personal experience, observation, and investigation in different peach districts of Canada and the United States. During the summer of 1903, the writer made a brief study of the peach industry of the State of Georgia. Many of the ideas set forth in the following pages are based upon the result of that study. Particular and frequent reference is made to methods practised in the great Hale orchards, of Fort Valley, Ga., where an up-to-date intensive system, on an extensive plan, is carried out. The results of investigations in other peach sections also are noted when fitting and opportune. An outline of the writer's experiments in winter spraying at Guelph will be found in its place, as well as some work on soil analysis. The leading writers on peach culture have been occasionally consulted and drawn upon to verify and complete the chronicle of our own somewhat limited observations and experience. The knowledge gleaned from these various sources has been applied, in the preparation of this article, to the condition of things in Ontario.

It has not been our purpose, however, to attempt a full and exhaustive treatise on the subject. To solve the thousand and one little and great problems that attend the culture of the peach, would be the work of a lifetime and probably a work in vain. Volumes could be written on each particular phase of the industry. In a comparatively short article, and one that is intended to cover briefly the whole subject, only the fundamental principles can be considered. For these reasons, we hope that the reader will pardon our sins of abbreviation and omission, and we trust that he may find something of interest as well as profit in what the following pages may tell.

I beg to acknowledge most gratefully the very valuable assistance that has been furnished me in the preparation of this article. I desire particularly to thank Mr. J. H. Hale, of South Glastonbury, Conn., Mr. J. H. Baird, Superintendent Hale-Georgia Orchard Co., Fort Valley, Ga., and his late assistant Mr. J. S. Seeley, for the many kind privileges afforded me when in Georgia, and for imparting to me a wealth of practical information. I am deeply indebted, also, to Mr. G. Harold Powell, Pomologist in charge of Fruit Storage Investigations, Washington, D.C., for valuable information and for the use of prints from which figures 2, 3, 4, 9, 10, 11, and 12 were taken. My thanks are due Prof. H. L. Hutt, Horticulturist at O.A.C., for figures 1, 5, 6, 7, 8, 15, 16, 17 and 18; and Prof. J. B. Reynolds, O.A.C., Guelph, for material assistance and for the use of apparatus required for making soil analyses. The bulletins of the North Carolina State Board of Agriculture dealing with some of the by-products of the industry, and one or two other up-to-date articles, were looked into to fill an

occasional gap in this article and to round off the corners. I wish also to thank those who have sent me samples of soils for analysis, and finally to tender my appreciation and acknowledgment of any favors received from sources that are not here specified.

THE HISTORY AND EXTENT OF PEACH CULTURE.

The peach is probably indigenous to China, and is supposed to have been introduced into Europe by way of Persia, from whence it takes its name. The date of its introduction into Europe is not definitely known. Historians tell us that it was grown and valued by the Romans in the first century. From Italy, it was carried into England about the 16th century by way of France.

Near the end of the 17th century the peach was introduced into America by the early settlers. Although a native of a foreign country, it is here that its greatest perfection has been attained. Undoubtedly, the United States is the greatest peach growing country in the world, and Georgia is the greatest peach state in the Union, being closely followed by Michigan. The States of California, Ohio, New York, Pennsylvania, Maryland, Delaware, and New Jersey also grow peaches more or less extensively. In Virginia, the mother state of peach culture, the industry is now almost abandoned. If the signs of the times fail not, it is safe to predict that the banner peach state of the future will be Texas, where to-day thousands upon thousands of acres are being planted.

In the northern states and Canada, peach regions are determined by the evenness and mildness of the climate in winter. The chief areas lie near the great lakes which have an ameliorating effect upon the climate. Near the sea coast the winds are usually too strong. In Canada, the chief peach-growing districts are found in the Niagara peninsula of Ontario, and in the counties bordering along Lake Erie.

Mr. W. W. Hilborn, of Leamington, states that peach culture in the Essex peninsula assumed large proportions prior to the freeze-out of 1899. Several thousand acres were planted to that fruit. Most of the orchards were well taken care of, hence were in fine condition, and the outlook was very promising. Long continued cold without any snow on the ground during the months of January and February of 1899 killed the trees by root-freezing. The tops were comparatively uninjured. After the freeze-out of 1899, quite a large acreage was replanted only to meet the same fate during the winter of 1904. Many of the growers are trying again, but are not going into it on so large a scale. Various methods of root protection will now be used, mostly cover crops with the addition perhaps of some coarse material spread around the base of the trees, such as straw, tomato vines, potato tops, etc., and a little earth thrown on top. At a meeting of the Board of Control of the Ontario Fruit Experiment Stations, held in January, 1907, it was decided to conduct experiments in budding peach trees upon hardy plum roots. It is hoped that such a practice will help to mitigate the disastrous effects of root freezing.

The Georgian Bay district can grow some varieties successfully, but cannot be considered a safe commercial locality. The factors detrimental to success are (according to Mr. J. G. Mitchell, of Clarksburg): First, distance from market; second, lateness of spring and shortness of season; and third, uncertainty of crop, due to various causes, such as late spring frosts, danger of severe freezing in winter, tenderness of fruit buds, etc.

Mr. W. H. Bunting, of St. Catharines, writes with regard to the peach industry in that district: "While the peach is to some extent a speculative crop and one on which any prospective grower would not be wise to depend exclusively, there is no fruit which is more attractive both from an æsthetic and financial standpoint. In the hands of a careful grower, three or four crops out of five can safely be counted upon in the Niagara district, and this has been greatly exceeded at times under favorable circumstances."

"The principal difficulties in the way of successful peach growing may be stated as follows: (1) *Insect pests.* The peach borer, which annually destroy many thousands of trees; the San Jose scale, which in a very short time will spread over an entire orchard and unless held in check will speedily consign the orchard to the brush pile. (2) *Fungous diseases.* The peach leaf curl, which infests some varieties, notably the Triumph and Elberta more so than many others; peach yellows, a most obscure and fatal disease, and one for which up to the present, notwithstanding the closest investigation, no remedy has been discovered; a disease known as "Little Peach" the above, climatic conditions sometimes result in the loss of the crop through severe winter temperature or late spring frosts.

"The peach industry in Canada has passed through a number of phases during the past twenty-five years, and has run the gauntlet of several severe tests during that time. These have, however, only served to demonstrate the fact that the Niagara District is well adapted to the successful cultivation of this luscious fruit under proper handling and management. An ever increasing market is opening up, and no doubt in the near future larger areas than ever will be devoted to the cultivation of this fruit."

Peaches may also be grown with more or less success in the provinces of Nova Scotia and British Columbia.

As far as the writer can learn, the first peaches for market in Canada were grown at Grimsby, Ontario, about the year 1820 by Mr. Dennis Wolverton, M.P.P. They were mostly natural fruit and were taken to Hamilton market. In 1856, Mr. C. E. Wolverton, who was one of the first and constituent members of the Ontario Fruit Growers' Association, planted five acres of a commercial peach orchard at "Maplehurst," Grimsby, consisting of such varieties as Early Purple, Early Barnard, Mountain Rose, Royal George, Early Crawford, Late Crawford, Morris White, Old Mixon, etc. He was, I understand, the first grower to attempt shipping peaches by express to the different Canadian markets. Within recent years rapid and progressive strides have been made and to-day the peach industry of Ontario is an important factor in the agricultural economics of the Province.

BOTANY AND CLASSIFICATION.

At one time the peach was thought to be derived from the almond, but now it is considered as an original species from China. Its botanical name has frequently been changed. Formerly it was known as *Amygdalus Persica*, also as *Persica vulgaris*, but now it is placed in a genus *Prunus* and given the specific name of *Prunus Persica*. *Prunus* is a genus of the order *Rosaceæ*. Some authorities go further and divide the species into two well marked types, the clingstones or pavies (*P. Persica vulgaris* of Risso), and the freestones (*P.P. domestica* of Risso).

There are five distinct races of peaches in North America. These were first recognized by Onderdonk, of the U. S. Department of Agriculture, and

by Price, of the Texas Experiment Station. The classification of Onderdonk, which separated the peach into five groups—the Persian, the Northern Chinese, the Southern Chinese, the Spanish, and the Peen-To—has since been adopted, with modifications, by G. Harold Powell, Bailey and others. Mr. Powell (Delaware Bull. 54) substituted in place of the name "Northern Chinese Race" the name "Chinese Cling Group," which is, as he advocates, in the interest of a more exact and practical nomenclature. A sixth group, the Oriental Bloods, has been mentioned commercially by the nurserymen of the South. A brief description of these different classes or groups is as follows:

(1) The *Persian* includes a large number of varieties most commonly grown in the north, as Crawford, Old Mixon, Salway, etc.

(2) The *Chinese Cling* is mainly characterized by broad-headed, spreading trees with very large flat leaves and large, mostly free or semi-cling fruit, represented by the Chinese Cling, Elberta, Carman, Greensboro, Smock, etc. This group is cultivated in most of the peach regions of the country, but is particularly adapted to the "Cotton Belt" of the South with Northern Florida as the southern boundary of its adaptability.

(3) The *Spanish* or Indian is supposed to have been originated in Florida and the Gulf Coast country as a variation from seed of foreign extraction. It is adapted to the latitude of North Florida. The fruit of this class is very late, firm, and often streaked, and is represented by such varieties as Cabler, Columbia, Galveston, Lulu, Texas, and Victoria.

(4) The *Southern Chinese* or Honey produces oval, long pointed fruits with a deep suture near the base, and includes the parent variety Honey, Climax, Oviedo, Taber, and others; the range of adaptability being from Middle Florida to Middle Georgia and west to the Mexican border.

(5) The *Peen-to* includes the parent Peen-to, which is a flat or tomato-shaped peach, and such varieties as the Angel, Suber, Waldo, and Jewel; cultivated largely in Southern Florida and semi-tropical latitudes.

(6) The *Oriental Bloods* are suited only to Southern latitudes, and comprise varieties with blood-red flesh, such as Red Ceylon and the Japan Dwarf Blood.

NURSERY MANAGEMENT AND PROPAGATION.

Selection and Treatment of the Seed. Before we can raise good peaches, we must raise the trees, and before we can raise good trees we must know how to select and treat the seed. Many growers prefer seed from natural fruit rather than from cultivated varieties, claiming that such is more vigorous and hardy and that the trees are longer lived. While this contention has considerable weight and no mistake is apt to be made by its adoption, yet, there are men who use only the seed from budded trees and with the same degree of success.

Whether selected from natural or cultivated fruits, care should be taken to secure pits that are healthy, of good size, and from ripe fruits. It is better also to obtain the seed from trees of known hardiness and strong growth. Preference is sometimes given to those from yellow peaches, particularly when the seedlings are to be budded with the same colored fruit. Pits from distilleries, or canneries where boiled, are not fit for the nursery as the boiling process destroys their vitality. When it is desired to grow the peach on heavier or moister soil than suits its own roots, the seed of the plum may be used for stocks. In those countries adapted to its growth, the hard-shell sweet almond is used as a stock in very dry soils.

To get an even stand of trees the pits should be stratified in the fall (i.e., mixed with alternating layers of sand in a box, or buried in a fairly dry spot in the garden or orchard) and exposed to freezing and thawing till spring. Or the pits may be kept till near spring, then soaked in water till the shells are well swollen with moisture. They should then be placed in thin layers on the surface of the ground and exposed to the action of frost, being protected from drying by a light covering of leaves or straw. In some sections of the country the seed may be sown in fall or winter directly in the nursery, but by so doing, only a portion will grow and no regularity can be attained in the rows. It is better to treat the seed by stratification, as that will prevent vacancies. In the spring, when taken up, most of the shells will be found to be cracked open; and others may be loosened with a hammer. They are then ready for planting in the nursery.

Choosing the Site. The most important requisite in choosing the site for a peach nursery is the selection of a suitable soil. Peach pits will grow in a more or less questionable shape on a variety of soils, but to get the best results, one should select a very light, sandy loam, well-drained, warm, and easy of cultivation. The proper exposure and location should also be considered. The sweep of prevailing winds should be avoided and, in this country, the slope of the land, if any, should be towards the north to retard bud growth in spring and where near large bodies of water the slope should be towards the water. Select also a place that is easy of access, near the road for ease in transporting the trees, and near the house so that the development of the young seedlings and buds may be conveniently watched. A location convenient to a constant water supply is also desirable.

Preparation of Ground. The ground for the nursery should be in the form of a square or a parallelogram, and it should be laid out so as to admit of horse cultivation. Strips of land should be left on all sides sufficiently wide to allow a horse to turn about upon. To get the soil in the best condition for the growth of young seedlings, a hoed crop should occupy the land the previous season. A fall plowing is necessary, and ribbing for winter will aid in pulverizing the clods. Another plowing in the spring, and a subsequent harrowing and rolling to smooth the surface, will leave the land in good condition to receive the pits. If the land is not rich enough, apply manure that is well rotted, and on some soils unleached hardwood ashes at the rate of forty or fifty bushels per acre may also be useful.

Planting the Seed. Nursery rows should be about three and a half or four feet apart, and laid out as straight as possible. Mark out and plow furrows two or three inches deep, and drop the pits about six inches apart in the drills. With a hoe or rake cover the pits and firmly press the soil upon them. Care should be taken that the seeds do not become dry or mouldy before they are planted.

Care of Nursery. The ground should be cultivated as often as is required to keep the weeds down and the soil loose, especially during the early growth of the young seedlings. Hand-hoeing is necessary between the trees in the rows. Where the seed has been sown too thickly, through carelessness or accident, the superfluous trees should be removed. As the season advances, the cultivator should be used less frequently, and when the trees are large enough to shade the ground between the rows it should be stopped altogether.

Budding. In Ontario, peach seedlings are budded during August and the early part of September. Budding may be done at any time during the growing season, when the bark peels easily, but in the north late work is necessary to prevent the buds starting into growth that fall and subsequently

being winter-killed. Buds of the desired variety are taken from vigorous growing healthy shoots of the current season's growth. If selected from trees of known worth, as pointed out in the section below, so much the better, as then there is less danger from degeneration, purity being insured, and such a practice tends to breed up rather than down. The upper buds on the shoot are usually discarded, as are also those at the lower end. The remaining portion of the shoot is termed a "stick." The leaf blades on these "sticks" are removed, and the petioles are left to serve as a handle for the buds, which are located always in the axils of the leaves. When the "sticks" are thus prepared they should be placed, butts down, in a bucket of water and covered so as to keep them fresh, and they should be used as soon as possible.

Three persons are required in the nursery to do the work properly—the budder, who should be experienced and an expert, and two boys, one to go ahead and strip the trees of their leaves for six inches above the ground, and the other to follow and tie the bud to the stock. The budder takes a bud from the "stick" and inserts it in a T-shaped incision on the north side of the stock near the ground. The tyer follows and applies a ligature of string or raffia with moderate pressure to hold the bark firmly over the bud. In about two weeks the buds should be united to the stock and the bandage may be removed. The buds should remain dormant until the following spring. When growth begins, the wood above the bud should be removed. Care must be taken to label the rows in the nursery true to name of the variety being propagated.

In the Southern States, June budding is practised by which means a tree sufficiently large for transplanting to the orchard is produced in one season from the seed. In fall budding, it takes two years from the seed or one year from the time the buds start into growth before the tree is ready for transplanting.

Care of Budded Trees. Soon after the top of the stock has been cut off, all the natural buds and twigs below the scion should be removed. This should be repeated as often as new buds or twigs appear. All shoots that spring from the roots must also be watched and kept down. Cultivation of the ground should be resumed and continued throughout the growing season. Early in the season a little nitrate of soda may be applied if the growth of the tree is not satisfactory. Summer pruning is practised by many nurserymen and sometimes with advantage. It is not essential, however. Whether it is advisable or not is a matter of opinion. Under another heading we shall consider this question more fully.

Improving Peach Trees by Selection. An important factor in connection with the propagation of peaches and other fruit trees, and one that does not receive the attention it merits from fruit-growers and nurserymen, is the question of propagating from bearing trees, and only from trees of known worth. Sufficient attention is not given to the character of the buds and scions used for propagating purposes. This is said to be a reason why so many of the old-time varieties of fruits have "run-out," and why so many good varieties of the present day are degenerating and giving place to new ones.

Nurserymen almost invariably cut their buds and scions from young trees not yet in bearing. This practice develops a tendency in our fruit trees to run too much to wood at the expense of fruit. By following it, we cast aside the elementary principles of plant improvement; we fail to take advantage of a simple principle that was practised, though unconsciously, by the plant growers of a hundred years ago, viz., selection from the best.

Many of us fail to appreciate the fact that fruit buds tend to vary. We know that distinct new varieties have arisen by bud variation, but we are not sensible to the possibility of a lesser bud variation—a variation or departure from the type which, though, perhaps, small at first, may eventually change the entire character of the variety that we are propagating. This change may be for better or for worse. The usual tendency is to degenerate or revert to the wild or natural species from which the variety originated. How important, then, is the question of propagating from trees that have borne fruit—trees of whose productivity and worth we are well acquainted.

Wood for propagating purposes, whether for budding, grafting, or making cuttings, should be selected as carefully from trees and plants of the ideal type as if we were selecting seeds. The principle of variation is as great in fruit buds as in seeds, or even in live stock. By applying this principle, and applying it in the fruit nursery, we will tend to breed up rather than down.

HOW TO START AN ORCHARD.

The Location. The selection of a suitable site for a peach orchard is most important. Although a problem which involves numerous and various difficulties, it is deserving of due and careful consideration by all intending planters. Opinions among growers of experience differ widely in regard to the best location, the best site, the best slope and the best exposure for a plantation of peach trees. It is obvious, then, that no direct rules can be laid down. We shall, however, mention a few general principles to indicate the proper course to pursue.

In the first place, it is important to locate the orchard near a good market or within reach of good transportation facilities. If two or more means of shipping are within reach, they would make the situation all the more desirable. Also select a place where plenty of help can be secured when required to harvest and market the fruit.

Probably the chief requisite in choosing a location is a situation that is, as far as possible, immune from frosts. Narrow valleys and depressions of any kind are not desirable. These form receptacles in which the cold air collects, as cold air, being dense and heavier than normal or warm air, settles to lower levels. This drainage of the atmosphere occurs only on still nights and under the most favorable circumstances. Another important subject of inquiry in locating an orchard and one akin to the preceding is the proper elevation. As low depressions are unsafe and very high elevations colder than comparatively low ones, it is not always the absolute elevation, but rather the relative elevation, of the site that must be considered.

The adaptability of a region in Ontario for peach growing depends also upon its proximity to large bodies of water. In no part of the world, perhaps, is the ameliorating influence of large bodies of water more distinctly marked than in those counties fringing on the Great Lakes. The limit of the boundary of the area over which the effects of these lakes are felt to be of economic importance depends largely upon the degree of the slope away from the water. Lands that gradually slope away from the lake feel the advantage of its proximity much farther than those lands that rise abruptly.

The exposure or aspect of the land must also be considered when deciding upon the location. A northern exposure retards the swelling of the buds which often occurs during warm spells in spring. A southern exposure gives earlier results and better colored fruits. Near large bodies of water the best slope is towards the water. Planting on the lee side of hills and

forests is also an advantage. All these points and many others should be looked into before arriving at a definite conclusion.

Difference in climate and soil, as well as innumerable local conditions unthought of and consequently unprepared for, tend to increase the difficulties met with in choosing a suitable site. Therefore, we must study closely local environments, we must profit by the experience of others, and we must use sound, firm judgment if we are to ascertain, with any degree of success, the proper location and exposure for a peach orchard. As a general statement, it is quite safe to say that a relatively high elevation and a northern exposure increase the probability of immunity from frosts and, as a consequence, afford the best location for an orchard in this Province. With, in addition, the Great Lakes nearby and the possibility of artificial protection by means of wind-breaks, and by no means least, the probability of securing more hardy varieties through careful selection of seedlings and scions from northern grown fruits, there is no apparent reason why the peach growing area of Ontario cannot be appreciably enlarged.

Wind-breaks. The importance of wind-breaks, in their relation to horticulture, is being recognized more and more as the art of fruit growing

FIG. 1. Young peach orchard, owned by Mr. J. L. Hilborn, Leamington, Ont. Trees two years old, previous to freeze of 1904.

advances. While there are a few who directly oppose them, yet it is safe to say that the greatest difference of opinion exists in conection with minor details rather than with the main question of their importance as a whole. In this short article, we shall not attempt to discuss the value of wind-breaks, but shall devote the space to a few remarks upon their construction.

For interior regions, a wind-break that is dense and hedge-like—with trees closely planted—is the most desirable. For districts situated near large bodies of water, one less dense is to be preferred. The relative denseness of wind-breaks depends upon the kind of tree used, the number and distance apart of rows, and the number of trees in each row. When two or more rows are planted it is well to have the trees in one row occurring alternately with those in the next.

Almost any strong-growing tree will do to make the wind-break. For heavy wind-breaks and for winter protection the coarser evergreens are best. In Canada and the Northern States, the Norway spruce is the evergreen most frequently employed. Austria, Scotch, and native pines, have also proven quite satisfactory. For light wind-breaks, deciduous trees are used. Among the best of those for the purpose are maples, elms, and Lombardy poplar. In some districts, and in fact, as a rule, a wind-break consisting of both coniferous and deciduous trees is the most serviceable.

The Soil. Many horticulturists and orchardists say that the peach is partial to only one kind of soil; others claim that it is adapted to different kinds, but particular kinds; and others again think that it will thrive on a great variety of soils, from light sand to heavy clay. We read of peaches growing in Michigan on drifting sand dunes; in Florida, on light pine sands; in Arkansas, on thin chocolate sands; in New England, on stony land and poor gravel; in Delaware and New Jersey, on light sandy loams; in parts of Ontario, on sandy loams; in Texas, on heavy, black loams; in West Virginia, on black soils of limestone origin; in Kansas, on black prairie soils; in parts of New York, on clay loams; and in Georgia, on stiff red clays. These are some of the peach soils that we read and hear about, and sometimes see. They must not be taken, however, to indicate the representative peach soils of the places named, as probably some of them refer to special and isolated cases.

When in Georgia, I observed that the so-called and much-talked-of red clays of the Georgia "peach belt" were only clayey in appearance and texture when wet. In this observation we were not alone. Many men, better informed in the matter and better fitted to express an opinion, supported us, going as far as to say that these soils, the so-called red clays, are in reality red sands. To verify these impressions, two samples were secured and taken to the Ontario Agricultural College, Guelph, and personally analyzed by the writer. The one purpose of the analysis being, as intimated, to obtain a correct definition for the soil. This red clay, it should be noted, constitutes the subsoil. The surface soil—six or eight inches deep—is composed of light gray sand with an occasional cropping out of the red soil from beneath. Two samples of this gray surface soil were also secured for analysis.

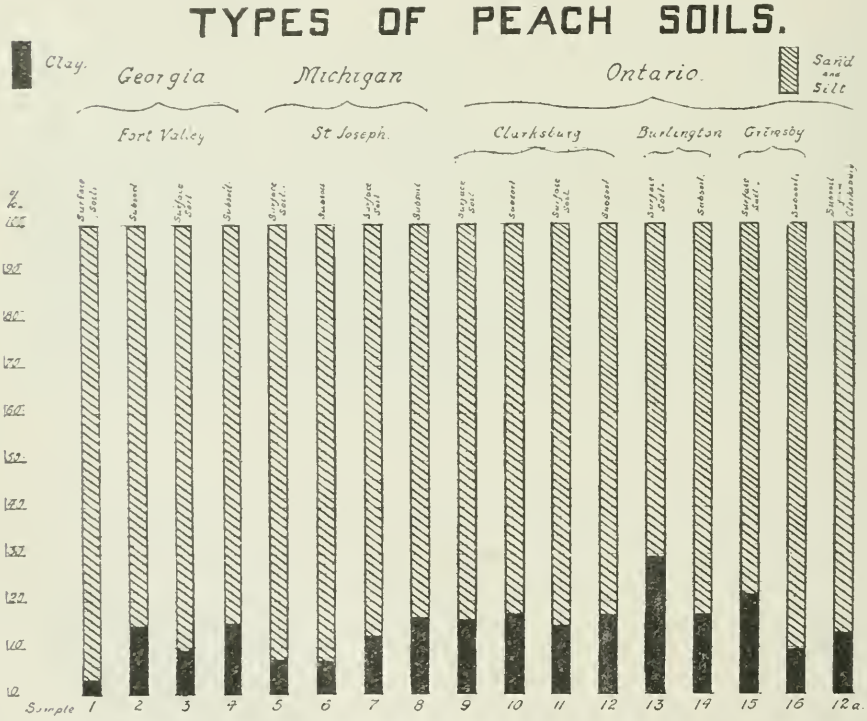
The results of the analyses show that the red "clay" of both samples, is made up of 85 per cent. sand and silt, indicating that it is in reality a light sandy loam. The surface soils both proved to be mostly sand, one analyzing 97 per cent., and the other about 91 per cent. sand and silt. Probably the clayey nature of the red soil is due to the presence of iron oxide, which in sandy soils is known to act as a cementing material. Although the analyses of these samples from Georgia have no direct bearing on the selection of peach soils in Ontario, they indirectly influence our notions of these things in two ways: first, by confirming the general impression that peaches require soils of sandy character; and second, by pointing out the fact that popular definitions are often far from exact.

The information gained in these mechanical analyses, led us to continue the work. A number of samples of surface and subsoils were secured from various peach sections; four from Michigan, and a dozen or so from different places in Ontario. A mechanical analysis was made of each with the purpose, as before, of defining the sample and of comparing the results. A short account of the work done with results may be found in the following section of this article.

As a general statement, it may be said that the best peach soil is a deep sand. Upon such soils, there is less wood growth at the expense of fruit, and the wood matures earlier in the season. Next to sandy soils are the light loams. Heavier soils induce late wood growth. All peach soils must be light, warm, deep, and well-drained. Mr. S. H. Rumph, of Marshallville, Ga., said to the writer: "On the prospective site, dig a hole five feet deep, leave over night, and if water runs into it, move on to some other locality." This advice is well worth noting, as probably the most essential feature in a peach soil is dryness; not too dry,—it must be retentive of moisture,—but rather dry than moist.

Mechanical Analyses of Soils.—Peach soils are by popular custom often erroneously defined. We read of peaches growing on soil of all types and conditions. A few of these are mentioned earlier in this article. As stated there, we thought it of interest to secure a number of samples for analysis; four were got in Georgia, four in Michigan and nine in Ontario. Each sample was separated by a definite method into different sized particles and by determining the percentage of soil grains over one-thousandth of an inch in diameter, a correct definition was secured. The following table was used as the basis for defining the samples

90 to 100	per cent.	greater than	$\frac{1}{100}$	of an inch	.....sand.
75 " 90	"	"	"	"	.....light sandy loam.
60 " 75	"	"	"	"	.....sandy loam.
40 " 60	"	"	"	"	.....loam.
25 " 40	"	"	"	"	.....clay loam.
10 " 25	"	"	"	"	.....clay.
0 " 10	"	"	"	"	.....heavy clay.



Diagrams of soils analyzed, showing relative percentages of sand and clay. Odd numbers represent surface soils, and even numbers, subsoils.

Description and Definition of Samples Analyzed.

No. 1. Surface soil from Fort Valley, Georgia, *Sandy soil,* containing 97.05 per cent. sand and silt. Brown. From virgin forest, adjoining orchard from which No. 3 was taken.

No. 2. Subsoil from Fort Valley, Ga. *Light sandy loam,* containing 85.75 per cent. sand and silt. A very deep red. Very tenacious, evidently due to the presence of iron oxide. From orchard of young trees.

No. 3. Surface soil from Fort Valley, Ga. *Sandy soil*, 90.62 per cent. sand and silt. Light brown. From orchard of known worth recently in fruiting trees and now growing young trees of first class vigor and health. Built up by commercial fertilizers and cow peas.

No. 4. Subsoil from Fort Valley, Ga. *Light sandy loam*, 84.65 per cent. sand and silt. Red. Composed of large and small lumps, but under microscope separate structure predominates; lumps probably due to cementing property of iron oxide. Similar in most respects to No. 2, differing only in being lighter in color. From record breaking orchard of Elbertas.

No. 5. Surface soil from St. Joseph, Michigan. *Sandy soil*, 92.40 per. cent. sand and silt. Brown, with slight tint of red. Incumbent upon subsoil No. 6. From orchard five years old, fertilized exclusively with barnyard manure.

No. 6. Subsoil from same place and orchard as No. 5. *Sandy soil*, 92.65 per cent. sand and silt. Light orange. Under microscope particles appear rounded, apparently coated with iron oxide.

No. 7. Surface soil from St. Joseph, Michigan. *Light sandy loam*, 87.55 per cent. sand and silt. Dark brown. Incumbent upon No. 8. From orchard twenty years old, fertilized exclusively with barnyard manure.

No. 8. Subsoil from same place and orchard as No. 7. *Light sandy loam*, 83.65 per cent. sand and silt. Dark gray, with faint tint of red. Particles rather coarse and showing presence of iron, but not so evenly rounded as those in No. 6.

No. 9. Subsoil from Clarksburg, Ontario. *Light sandy loam*, 84 per cent. sand and silt, rather fine in grain. Brown. Incumbent upon No. 10. From land thirty years in farm crops and five years in bearing peaches, fertilized by barnyard manure.

No. 10. Subsoil underneath No. 9. *Light sandy loam*, 82.5 per cent. sand and silt. Brown. Taken from four inches deep, too near the surface. Practically the same as No. 9.

No. 11. Surface soil from Clarksburg, Ontario. *Light sandy loam*, 85.5 per cent. sand and silt. Brown. Apparently same as No. 9. From land thirty-five years in farm crops, fertilized by barnyard manure.

No. 12. Subsoil underneath No. 11. *Light sandy loam*, 82.5 per cent. sand and silt. Same as Nos. 9, 10, and 11.

No. 13. Surface soil from Burlington, Ontario. *Sandy loam*. 70.85 per cent. sand and silt. Brown. Incumbent upon No. 14. From orchard twelve years old, fertilized with wood ashes.

No. 14. Subsoil underneath No. 13. *Light sandy loam*, 83.20 per cent. sand and silt. Reddish brown. Quite similar in appearance and texture to No. 13.

No. 15. Surface soil from Grimsby, Ontario. *Light sandy loam*, 78.5 per cent. sand and silt. Brown. Many coarse particles and probably some gravel. Typical peach soil of the section. Last fertilized five years ago with wood ashes.

No. 16. Subsoil underneath No. 15. *Sandy soil*, 90.5 per cent. sand and silt. Red brown. A more even soil than No. 15, and with finer particles.

Extra:

No. 12 (a). Subsoil from Clarksburg, Ontario. Selected from two feet deep on same farm as Nos. 9, 10, 11, and 12. *Light sandy loam*, 87 per cent. sand and silt. Brown.

Selection of Varieties. When starting an orchard, one must first choose the location and soil and then decide upon the varieties to be planted. To give advice upon this point is a difficult problem. Various factors must be taken into consideration. With some men, personal preference largely influences the success of the venture. Local conditions of soil and climate must be studied and varieties chosen that are best adapted to such conditions. Planters should have some purpose in view, some particular market to be filled and select accordingly. Inter-pollination should also be considered; while this is not so important in peaches as with some other kinds of fruits, yet it is safer never to plant an orchard of one variety alone. These are general pointers.

To be more explicit, select varieties with reference to adaptation, hardy and suited to your soil; to productiveness, not shy bearers; to health, as some varieties are more subject to some diseases than others; to vigor, and

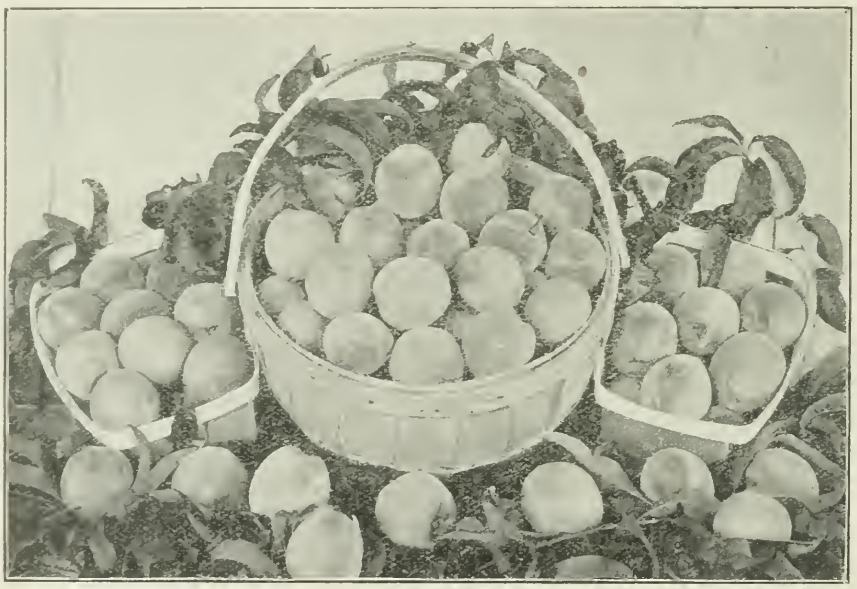


Fig. 2. Ruddy-cheeked, golden Elbertas in picking basket and "cups."

save the plant doctor's bill; to season of ripening, late or early; and to early bearing and longevity,—worth considering, but not essential in the case of peaches. Among the qualities to be decided upon with reference to the fruit of the peach, we have appearance, size, color, freestone or clingstone, white or yellow flesh, flavor, texture, firmness, thickness of skin, and keeping qualities.

The number of varieties that one should plant will depend upon the markets to be supplied and the method of marketing. When catering to both local and distant markets, plant varieties to ripen early and late so as keep up a full supply of marketable fruit from the beginning to the end of the season. When large shipments in refrigerator cars are in prospect, select varieties that will ripen at or near the same time so as always to have sufficient fruit to fill the car, or better still, plant enough trees of one variety for a particular season, as varieties behave differently in cold storage. The fundamental principle in choosing varieties is to profit by the experi-

ence of our neighbors, to observe the behavior of varieties growing under conditions similar to your own, and to be governed accordingly.

The uncertainty of varietal names is a matter that requires particular attention. New varieties, or, rather, new varietal names, often spring into existence from the mind of some nurseryman or fruit grower. Every season new varieties are offered for sale which, in some cases, are nothing more than old varieties with new names. These impositions may be charged to one of two causes: a direct attempt to defraud the public by substituting a new name for an old one, or a less direct attempt at fraud through the loss of the original name and subsequent substitution. Neither cause is excusable. Besides this substitution of names, the planter of new varieties should remember that wide variations are found in many well-established varieties, also distinct strains. Crawford's Early and many other varieties of peaches are known to exist in distinct strains, differing in size, shape, color, season of ripening, quality, and productiveness. These varieties are probably due to bud variation and subsequent propagation, and should be borne in mind when making a selection.

Commercial Varieties Recommended by Prominent Growers in each Peach District of Ontario.

J. W. Smith, Winona.

General list in order of ripening: Alexander, Early Rivers, Hale's Early, Yellow St. John , Early Crawford, Fitzgerald, Late Crawford, Elberta, Longhurst, Crosby, Smock.

For long distance shipping: Yellow St. John, Early Crawford, Elberta, Smock.

Hardy: Crosby, Longhurst, Lemon Free, Alexander, Early Rivers.

For canning: Yellow St. John, Mountain Rose, Early Crawford, Garfield, Elberta, Late Crawford, Smock.

For evaporating: Longhurst, Lemon Free, Smock.

W. W. Hilborn, Leamington.

General list in order of ripening: Alexander, St. John, Garfield, Early Crawford, Fitzgerald, New Prolific, Engol Mammoth, Elberta, Golden Drop, Bronson, Kalamazoo, Smock, Banner.

For long distance shipping: Early Crawford, Garfield, New Prolific, Elberta, Engol Mammoth, Golden Drop, Bronson, Smock, Banner.

Hardy: Alexander, Fitzgerald, Barnard, New Prolific, Crosby, Tyhurst, Longhurst, Lemon Free, Golden Drop, Banner.

For canning: St. John, Garfield, Early Crawford, Fitzgerald, New Prolific, Barnard, Engol Mammoth, Old Mixon, Mountain Rose, Crosby, Golden Drop, Lemon Free, Banner.

For evaporating: Garfield, Early Crawford, Barnard, New Prolific, Elberta, Golden Drop, Longhurst, Lemon Free, Smock.

J. G. Mitchell, Clarksburg.

General list in order of ripening: Triumph, Champion, Red Canada, Fitzgerald, Tyehurst, Early Crawford, Elberta, Bowslaugh's Late, Late Crawford.

Hardy: Triumph, Fitzgerald, Tyehurst, Bowslaugh's Late.

Canning and evaporating: St. John, Early Crawford, Reeve's Favorite, Elberta, Longhurst, Late Crawford, Smithson, Smock.

W. H. Bunting, St. Catharines.

General list in order of ripening: Yellow-fleshed—Triumph, St. John, Early Crawford, Brigdon, Fitzgerald, Foster, Reeve's Favorite, Chair's Choice, Elberta, Globe, Late Crawford, Smithson, Smock. White-fleshed—Alexander, Greensboro, Champion, Old Mixon Free.

For long distance shipping: Early Crawford, Reeve's Favorite, Elberta, Old Mixon, Globe, Late Crawford, Smithson, Smock.

Hardy: Triumph, St. John, Fitzgerald, Crosby, Longhurst, Smock.

A glance at these lists shows a marked partiality for varieties of yellow flesh. The same tendency is prevalent throughout the entire peach growing section of this Province, and is due largely to the popularity of the Early Crawford peach for canning purposes. While a pardonable failing, in that some yellow fleshed varieties are as desirable, if not more so, for special purposes than some white ones, yet, from a dessert standpoint, it is entirely without substantial grounds and should be different. It is somewhat, however, a matter of personal taste and opinion. One market seems to flavor flesh of one color and another something different. The English markets, as well as many cities in America, especially Philadelphia, prefer peaches with white flesh; other markets, as New York and Toronto, favor those of yellow flesh. There is no real foundation for preferring one more than the other. For dessert purposes there are just as good peaches with white flesh as with yellow and vice versa. In fact, the flavor and quality of many of the white ones is superior to the best of the yellows.

In the great peach state of Georgia the leading varieties grown for the northern markets are white fleshed, with one notable exception, the Elberta. Here are a few well worth being adopted by our peach men, if they prove adapted to our soil and climatic conditions: Greensboro, Waddell, Carman, Hiley, Thurber, and Belle of Georgia. These are arranged in order of ripening. All have white or creamy flesh and are free or partial freestones. Hiley and Thurber are excellent shippers and of fine appearance; the latter ripens just before the Belle of Georgia, which immediately precedes Elberta, and is the best peach of its season for commercial purposes. Hiley was awarded the Wiley medal at the second last meeting of the American Pomological Society at Boston, a most worthy distinction, this medal being given only to one new fruit each year. It certainly is a handsome peach, highly colored and showy, and ripens just before Thurber.

Selection of Suitable Trees. Having decided upon the varieties to be planted, the next thing is to secure trees of those varieties that will give the best possible results. In the first place, the trees must be true to variety type and not older than one year from the bud. Large trees are not always the best; medium sized ones are usually more satisfactory to plant. Whether large or small, they should be healthy, thrifty, smooth and well grown, but not spindly. They should possess good roots and be free of bruises, fungi, and injurious insects. It is best to avoid trees grown in districts subject to peach yellows, peach leaf curl, and the San Jose scale. To secure these desirable features in the trees, it is advisable to have a written agreement with the nurseryman to that effect. Allow no substitution of varieties and

reject all inferior stock. Trees for northern regions should be from a northern nursery. When convenient to a nursery, it is well to inspect the stock and buy direct from the nursery rows.

Preparation of the Soil. The best method of preparing the soil for peach growing is to grow a preparatory crop for one or two seasons before planting out the trees. On very rich lands, the best crop of this kind is one that will take the excess of nitrogen out of the soil and one that may be cultivated to improve the physical condition of the soil. Poor, worn-out land had better be sown to clover or some similar green crop for plowing under. If time is limited and previous cropping cannot be done, the preparation of the soil as it stands should be most thorough and complete.

All stumps, roots, stones, or other obstructions should be cleared off the land. Subsoiling is necessary when the land has a hardpan stratum resting immediately underneath the surface. All wet spots or pockets should be well under-drained, as well-drained land is an imperative necessity for successful peach culture.

The ground should be broken early in the fall to a depth of about six or eight inches. Fall cultivation should be practised to thoroughly pulverize the clods and rot the sod, and then the land should be ribbed up for winter. This is done to assist drainage, and thereby enable the land to dry off quickly early in the spring and to permit the frost to further pulverize the soil. As soon as the soil warms up in the spring, the ribs should be worked down and the land well cultivated.

Preparation of Trees for Planting: Before planting in the orchard, the ragged and bruised roots of the trees should be cut off to prevent rotting. This should be done smoothly with a sharp bladed knife so that the wounds will callous and heal rapidly. The tops also should be pruned back to correspond to the roots that are left, if not more severely so. Pruning back to whips is generally practised with peach trees, particularly in southern countries. A modification of this is practised in the north, each tree being pruned by cutting off all the side branches to stubs with a single bud at the base of each. The top of the tree is cut off at a distance from the ground corresponding to the length of the trunk desired for the tree. This is best done, perhaps, after the trees are set so as to have them uniform.

There is a great diversity of opinion among growers as to the proper height at which to start the head. In Canada the usual height is not less than three feet, but in the south and many of the northern states 12 to 18 inches is regarded as the best. In Ontario the relatively high head is adopted on account of the fact that the fruit is thought to ripen better on high heads, and because it is easier to cultivate the land close to the trees. While the contention that the fruit ripens better may be true, yet it has not proved to be true in the orchards of the northern states. Why should it be true in Ontario? We have yet to learn of any definite experimental data that confirms this contention.

The advantage in ease of cultivation is more worthy of consideration as the expense of working the orchards is sometimes increased by having to dig the spaces around the trees which cannot be reached by the plow or cultivator when the head is low. This extra expense can be done away with, however, by the use of up-to-date implements, adapted and made especially for this kind of orchard work. Such a machine is found in reversible cut-away orchard plows and in various extension disk harrows that are made in Canada and elsewhere.

Low-headed orchards may be worked also by plowing in spring as close to the trees as possible and then using an ordinary low spring-tooth harrow

to level this and to loosen the soil near the trees that cannot be reached with the plow. A harrow must be used that has two sections, and these sections should be extended or separated by means of a wide "evener" or "spreader" fastened between them. The width of the spreader will depend upon the distance between the plowed area and the trunks of the trees. On very light soils, a smoothing harrow may be used instead if adjusted in a similar manner. Another means of working under low-headed trees is the use of a plow followed by an ordinary plank drag. Plow as close to the trees as possible, then use the drag by driving zig-zag around and between the trees.

Some important advantages are gained by adopting low heads. The trunk of the tree is protected from the heat of the summer's sun and from sunscald in winter. A low head will stand a storm better and less attention need be given to wind-breaks for the orchard. But the advantage of most moment, and one, that to my mind, outweighs all the good features claimed for a high head, is that the fruit can be picked from the ground, no ladders being required for that purpose. In large orchards, and especially in seasons of abundant crops, and when labor is scarce as it is to-day in Ontario, this feature adequately compensates for the extra expense of cultivation, if any, and for what some growers claim may be lost through the tardy ripening of a few fruits on the lower branches.

In connection with trimming trees to whips and starting low heads, a close method of root-pruning, known as the Stringfellow method, has been widely practised and discussed, particularly in the state of Texas. The method consists in cutting off the roots to mere stubs an inch or two long and cutting back the top with corresponding severity. Although Mr. Stringfellow says: "It applies to trees of all ages, everywhere, and the larger the tree the more necessary it is to root prune," it has not proved desirable in the north, especially in the heavier soils and with large trees. It is advisable, therefore, to let well enough alone and allow the other fellow to do the experimenting.

Planting. Peach trees should be planted 20 by 20 feet apart, if the soil is in good condition. Some varieties require more room than others; e.g., the Elberta needs more space than the St. John as its habit of growth is more spreading. Where the soil is poor and the variety upright in growth, the trees may be planted closer. In an orchard of many varieties, it is best to choose one distance apart for all so that the long rows of trees will be in perfectly straight lines. Usually the greatest mistake in planting is in the matter of crowding. This should be avoided so as to admit of sufficient root room for the trees; also, to facilitate the operations of spraying and harvesting, to admit the sunlight and to allow of good cultivation.

The time for planting in Ontario is in spring, as early as the ground is fit to work. Planting at this time is generally considered safer than planting in the fall, as the dangers of winter-killing and heaving of the trees are averted.

There are many systems of arranging trees in the orchard, the most common of which are the square, the rectangular and the hexagonal. The simplest of these is the square system by which 108 trees, 20 feet apart, may be planted on an acre, each four adjacent trees forming a square, the rows being the same distance apart each way. Under ordinary conditions, peaches, being comparatively short-lived and not very large trees, are best planted by this method. When closer planting is desired, a better way is to plant on the rectangular system, and remove every other row of trees when they become crowded. By this method the rows are farther apart one way than the other. For instance, instead of planting 20 by 20, plant at first 12 by

16 feet and secure one or more crops from the trees when closely planted, and as soon as they begin to crowd take out the 12-foot row, leaving the trees 16 by 24 feet apart, by which distance there would be left 113 trees trees per acre. This method of planting is an excellent one when properly carried out. It is a dangerous one, however, for the majority of orchardists to follow as it is only the few who have the will and the heart to cut down strong vigorous trees in the prime of productiveness.

The hexagonal system is a little more complicated than either of the preceding but allows of 15 per cent. more trees to the acres without any more crowding. In this system the adjacent trees form a hexagonal figure, enclosing one tree in the centre. The trees in one row alternate with those in the next, thus forming a system of equilateral triangles. This plan may be used for peaches with advantage, but is best suited for trees of larger size such as apple orchards.

On very hilly lands, and especially where the soil is sandy and apt to be washed by rains, the rows should be laid off at water level. No regular system can be followed other than to plant horizontal lines on the sides of the ridges. In case the lines separate widely, short additional rows may be inserted to utilize the space.

To stake out an orchard on the square or rectangular plan, furrows and cross furrows may be drawn and the trees planted at the intersections. This method is only applicable to level land. A more accurate plan is to lay off the orchard by means of stakes and a long wire. The wire is stretched along one side with the ends attached to stout stakes. The desired distance apart for the trees is marked on the wire and a stake is placed at each mark to indicate the position of the tree. One of the ends is laid off at right angles in the same way and the intervening stakes are also set by means of the wire.

In the hexagonal system, the first row is staked out in much the same manner. To locate the trees at the ends of the second, the distance apart of the trees in the first row is taken as a base upon which to erect an equilateral triangle, the apex of which gives the required position. The row is then staked out as before.

For all these plans, sighting also is necessary to accurately place the stakes in line. At regular intervals, alleys and cross alleys should be made by leaving out a row of stakes. By so doing, the orchard will be laid out in blocks which will greatly facilitate labor in harvesting. There should be only one variety to a block, and all blocks of the same variety should be planted together. The orchard is now ready for the actual planting.

When the trees are brought from the nursery, the roots should be covered with wet sacking to avoid exposure to sun and wind. If they have not already been trimmed and prepared for planting, as suggested under the previous heading, it should be done at this time. At each place designated by a stake, a hole should be dug large enough to allow a full spread of roots, and deep enough to allow a few shovelfuls of rich surface soil on the bottom.

For planting small orchards, a planting board may be used to place the trees on the exact spot marked by the stake. This board is about five feet long with holes in the end and a notch in the centre. The notch is placed around the stake, wooden pins are driven into the soil through the holes in the ends, the board is removed, the stake lifted, and the hole is dug. A tree is then dropped into the hole, the board is again put in position over the wooden pins and the tree takes the place of the original stake in the central notch. This is a good method for small plantings but has no place in the work of large commercial orchards.

In setting out large plantations, a tree is planted at each end of the row, others in the centre and at intervals along the row, and, by sighting, the intervening trees are easily put in line. Two persons are needed in planting the trees, one to hold the tree and tramp the earth firmly about the roots as fast as the other throws it in. The tree should be set deep enough to place the union of the stock and bud a couple of inches below the surface of the soil. In very light soils, the peach may be planted deeper than on heavier soils. While the peach is a shallow-rooted tree and should be planted not too deeply, yet too shallow planting should be avoided, mainly to prevent the danger of washing and consequent exposure of the roots and crown; and because, on shallow-rooted trees, borers are more troublesome, as they are apt to work down underneath the roots where they cannot be reached. Too deep planting also should be avoided, as peach roots require plenty of air and are very sensitive to smothering.

On very thin soils, a handful or two of bone-dust, ashes, or some ammoniated fertilizer, mixed with the earth in the hole, may be beneficial. As soon as the orchard is planted, a record of the planting should be made, giving names and locations of varieties, names of nurserymen if trees have not been raised at home, and other bits of information for future reference.

ORCHARD CULTURE AND CARE.

Inter-cropping. Many of the leading peach growers, and some of the best writers on horticulture, advocate clean cultivation from the start for peach orchards. On the other hand, we occasionally hear of extreme cases of non-cultivation. The former is decidedly the more preferable practice, especially on light, sandy land. Happily, however, one is not required to choose either method, as between these two extremes there is a happy medium.

Cropping is allowable in a young peach orchard, if suitable crops are grown, but it should be discontinued after the third year, at the latest. Cropping gives a return from the land until the trees begin to pay for the cost of cultivation. The growing of grasses and grains should be condemned; even clovers, except for cover crops, are undesirable as they prevent cultivation. No crop should be grown that requires late tillage or late stirring of the soil at harvest time. Potatoes are objectionable for this reason. Strawberries and bush fruits should not be grown in a peach orchard; the former do not permit of good cultivation at the right time in the season, and the latter needlessly take up room as they do not bear more than a crop or two before the proper time to cut them out. Corn exhausts the soil and is not well adapted to those soils best suited for peach culture.

The best crops for this purpose are those which may be hoed and cultivated until mid-summer, and at the same time do not draw too severely upon the fertility of the soil, nor encroach upon the trees. A partial exception to this rule, however, is the practice of growing fillers until the trees commence to crowd. This was noted under the heading of planting in connection with our remarks on the rectangular system and is nothing more than a modified plan of inter-cropping. As one good crop of peaches will pay for the previous care of the orchard, this plan alone without additional inter-cropping is most commendable. Beans and peas are among the desirable crops for a peach orchard, as they are not very exhaustive and require thorough tillage. Small vegetables and tomatoes are favored by some orchardists and many other crops that meet the aforesaid requirements.

Cultivation. The land in a peach orchard should be thoroughly tilled every season from early spring till the middle of July or first of August. Peach trees readily respond to good cultivation. Some growers throw the soil alternately to and from the trees; however, the level cultivation is to be preferred. This cultivation should be done every two weeks or so and as soon as possible after every rain. In young orchards it should be more or less deep to induce a downward growth of the roots. In bearing orchards, shallow cultivation is the rule, and perhaps is best for the immediate benefit of the orchard; but it is thought, by some authorities, to be one of the causes of the short life of modern peach trees. Moderately deep tillage is not harmful, to say the least.

FIG. 3. Clean cultivation in the Hale orchard of low-headed trees (Belle of Georgia, 4 years old).

Spring cultivation should be fairly deep and, as the season advances, it may become shallower and lighter. About mid-summer, when the wood of the trees is nearing maturity for the season, cultivation should cease altogether. At the last cultivation, a cover crop may be sown. Although high culture and particular attention is required in the peach orchard, it can be overdone and result in an over-abundance of wood growth. Such a condition is brought about by intense and late tillage on strong, rich land.

We have not the time or space to undertake a discussion of the principles of tillage. To give us a keener appreciation of its worth, however, and to enable us to apply our knowledge more intelligently, it may be well to note briefly the benefits of the operation. The following summary is based upon and similar to the one systematized by Bailey in the "Principles of Fruit Growing":

1. Tillage improves the physical condition of the land.
(*a*) By fining the soil, and thereby presenting a greater feeding surface for roots;
(*b*) By deepening the soil, and thereby giving a greater foraging area to the plant;
(*c*) By warming and drying the soil in spring; and
(*d*) By reducing the extremities of temperature and moisture.
2. Tillage helps to conserve soil moisture,
(*e*) By increasing the water-holding capacity of the soil;

(*f*) By checking evaporation; and
(*g*) By destroying weeds which appropriate moisture.
3. Tillage helps to render plant food available,
(*h*) By admitting oxygen;
(*i*) By promoting nitrification;
(*j*) By directly liberating plant food; and
(*k*) By hastening the decomposition of organic matter.
4. Tillage helps to hold in check insect and fungous enemies.
5. Tillage is of more than usual benefit to peach trees during the season following winter injury. (Mo. Exp. Sta. Bull. 55).

Implements. The number and nature of the implements required for a peach orchard depend much upon the kind of soil and the method of cultivation to be practised. Among the most useful for general use are: One horse scuffler, for working around young trees; disk, cutaway, Acme and smoothing harrows; spring-tooth cultivator with set of wide blades; ordinary steel plows and an extension plow for getting up close to the trunks of low spreading trees; roller, orchard wagons, etc. Short whiffletrees with no projecting hooks, and harnesses with low collars and hames and no turrets, must be used to avoid injury to the trees. Various kinds of small tools, not necessary to mention, will be required, besides pruning and spraying apparatus.

Fertilizers and Manures. In a general way it may be said that the most essential elements of plant food for fruit orchards are nitrogen, phosphoric acid and potash. The proportion and amount of these that should be applied varies with the different kinds of fruit. For the peach, plenty of potash and phosphoric acid is required and only small quantities of nitrogen. The proportion and quantity required for a particular orchard will vary with the texture and condition of the soil and the amount and condition of availability of the plant foods it already contains. The only way to determine the wants of the soil is to experiment and note the results.

An over-supply of nitrogen is ruinous to peach trees. It has been found that: "The peach is healthiest and yields the best fruit in soils which for most crops would be considered deficient in nitrogen." Also, that trees suffer from winterkilling when overfed with nitrogen, are more liable to be infected with brown rot, and produce later and poorer crops of fruit. It is obvious, then, that one must be cautious when using nitrogenous fertilizers.

A liberal application of nitrogen is important, however, for young growing trees, and also for mature trees when the leaves appear smaller than natural and take on a yellowish color. Although this condition of the leaves usually indicates a lack of nitrogen, it also may indicate the presence of excessive moisture in the soil. Too much nitrogen is indicated by unusually dark green foliage, rank growth, large crops of small poorly colored fruit or no crop at all, and immaturity of the wood in fall. When this fertilizer is required to stimulate early growth or restore impoverished bearing trees, it is most effectively applied in the form of nitrate of soda. Another commercial form of nitrogen is sulphate of ammonium. This also may be used for peaches, but it is not so quick in its action as nitrate of soda.

The most economical method of furnishing nitrogen is by means of tillage and green leguminous manures; the former promotes nitrification; the latter indirectly adds nitrogen to the soil from the air and it also prevents the leaching of nitrates already in the soil. On poor, gravelly knolls some commercial form of nitrogen may be used with advantage, and it should be applied early in the season as late applications tend to prevent a proper ripening of the wood for winter.

Phosphoric acid in some commercial form is essential to the growing of good peaches. The tree, the fruit and the seed are all benefited most decidedly by its application. Peach soils, being light and sandy, are likely to be deficient in this constituent. In heavier soils, it is often present in an unavailable form and requires cultivation to liberate it. Phosphoric acid is usually applied to the soil in the form of bone meal or superphosphates. Bone meal also supplies a small quantity of nitrogen. Superphosphates are apt to be strongly acid and should be applied in the fall or winter when the tree is dormant, at the rate of about two hundred pounds per acre. Thomas or basic slag is a form of phosphoric acid that gives very good results on sandy soils. It must be very finely ground as it parts with its fertility very slowly. Dissolved South Carolina rock is another valuable form of this fertilizer.

Potash is the most essential element of fertility in a peach orchard. Like phosphoric acid, it induces fruitfulness rather than excessive wood growth. Chemically speaking, it forms salts of the organic acids in the plant, it is supposed to assist in the formation of starch and the assimilation of carbon, and it influences the flavor. Also, when abundantly supplied, it causes the fruit to color up better. It is often deficient in peach soils and must be supplied artificially. The most economical source of potash is unleached hardwood ashes. These also supply a small amount of phosphoric acid. The potash in wood ashes is immediately available. Forty to fifty bushels per acre is the usual rate of application. Muriate of potash is a form of potash that also gives excellent results with peach trees. It is a definite compound containing about 50 per cent. of actual potash and may be used at the rate of 200 pounds per acre. This and other references to the amount required are merely suggestions. Local conditions and experiment alone can tell. A common potassium salt used as manure is kianite. It is an impure form of muriate of potash, and contains about 13 per cent. of potash. Sulphate of potash is also used by some growers. Potassic manures should be spread over the ground when the trees are dormant in fall or spring and worked in with a cultivator. Wood ashes may be applied at any time.*

Other elements of importance, but usually present in the soil in sufficient quantities, are lime and iron. Lime is said to strengthen the woody portions of the tree and to hasten the time of ripening of the tree and the fruit. It also has a marked effect upon the physical condition of the soil. It acts as a fertilizer to some extent by aiding nitrification and by liberating potash from insoluble compounds in the soil. Lime also is thought to favor the "catch" of clover, especially crimson clover, on light soils where cover crops are to be grown.

Iron gives a body and a flavor as well as a color to the peaches which readily distinguish them from those grown on soils lacking in this respect. The advantages in quality and color of fruit gained by the presence of iron may be overbalanced by its chemical property of rendering the super-

*According to Dr. Wiley, (U. S. Year Book, 1896, p. 129), muriate of potash and kainite tend to diminish the sugar content of grapes and thus impair the quality of the wine. In the case of sugar beets, also, he says their use is of doubtful propriety. The cause of the injury to these crops is found in the potassium and other chlorides which these fertilizers contain. Reasoning, then, from analogy, it is safe to say that these chlorated fertilizers should be applied with caution to peach orchards that are grown expressly or in part for wine making and the manufacture of jams and other by-products whose quality depends upon the content of sugar in the fruit. For orchards of this kind, it is safer to use potassium sulphate or wood ashes.

phosphates of the soil insoluble. There is not much danger of this, however, unless the iron is present in excessive quantities.

Barnyard manure as a fertilizer for peach trees is not favored by the majority of orchardists. Its use seems to encourage fungus diseases, more so than artificial fertilizers. Hale, the "Peach King," says that peaches stimulated by stable manures are more liable to yellows than those fertilized by commercial fertilizers. The effect of barnyard manure is similar to that of other nitrogenous fertilizers and its use may be governed by similar conditions. For young orchards on poor soil its use is beneficial. The manager of a large plantation in Georgia told the writer that he spreads two forkfuls of manure around each young tree in winter. Generally speaking, its use is confined, as in this case, to the stimulation of early growth in newly set orchards.

Cover Crops. Closely allied to the operations of fertilizers and tillage is the growing of cover crops. Neither can be practised economically without the aid of one or both of the others. In the general round of orchard work we fertilize during the dormant season, we cultivate in spring and early summer, and we grow cover crops in late summer and fall. When cultivation ceases, the cover crop should be sown, and in the spring, after serving as a fall and winter covering for the ground, it is plowed under.

There are two kinds of cover crops, leguminous and non-leguminous; the former increases the nitrogen content of the soil by appropriating atmospheric nitrogen; the non-leguminous adds nothing to the soil other than the plant foods taken up in its growth. Cover crops also keep the ground mellow and in good physical condition by the addition of humus; they dry the ground and prevent too rapid wood growth in fall and aid the ripening of the trees for winter; they serve as a protection for the roots; they help to free plant foods in the soil; they prevent leaching of nitrates, when the trees have ceased growth; they prevent soil erosion; they prevent the running together of hard soils; they hold rain and snow till they soak into the earth, and thus increase the moisture supply; they also increase the moisture holding capacity of the soil; they allow early tillage by drying out the soil in spring; and they keep the soil at a uniform temperature, and thus make the winter weather less severe for peach trees. Whether one or all of these benefits may be expected to follow the use of cover crops depends upon local conditions of soil and climate.

The kind of cover crop to grow is more or less a local question. Weeds are better than nothing. Certain crops do better in one part of the country than in another. In young peach orchards it is best to grow a crop of the leguminous type. In bearing orchards, it is wiser to practise a rotation and grow non-leguminous plants occasionally, as a too frequent use of leguminous crops may result in an over-supply of nitrogen.

Among the best of the legumes for cover crops in the peach districts of Ontario are crimson clover, hairy vetch, and cow peas. Crimson clover makes a thick cover before cold weather, forms a very large root growth and altogether furnishes an excellent green crop for plowing under in the north. It is sown at the rate of 15 or 20 pounds per acre, depending upon the richness of the soil. Hairy vetch makes a rank growth and is more hardy than crimson clover. It is much favored as a cover crop but, as the seed is very expensive, it is not so much used as the clovers. The mammoth and common red clovers and lucerne are also grown to some extent and give good results. In the Niagara district where a comparatively long season allows it to make a luxurious growth, cow peas promise to be one of the most profitable and serviceable of cover crops. It is perhaps the best of crops

for this purpose in all sections favorable to its growth. It may be sown at the rate of one bushel to the acre, in drills; or two bushels to the acre when sown broadcast.

Of the non-leguminous crops, rye and oats are the most extensively grown. Rye is a very strong grower and succeeds when others fail. It should be plowed under very early in the spring as its rank growth is apt to rob the tree of its moisture. Oats make a very fair cover in the fall but die down on the approach of winter. Indian corn, buckwheat, rape and various other crops are used as covers, each more or less successful in different parts of the Province.

FIG. 4. Low-headed Elberta tree.

Pruning. At the time of planting, peach trees should be trimmed, both root and top, and started with low heads, as suggested under a previous heading. Opinions differ with regard to this point, as already stated, and a diversity of opinion among growers also exists with regard to the proper method of pruning the trees after they are set out. As a discussion of these various methods is scarcely necessary, we shall confine our attention to the one we think best.

During the first season after planting, any sprouts that form below the main limbs should be rubbed off. The main branches will start near the top of the trimmed whip or from the stubs that are left, depending, of course, upon the method of trimming practised. Three or four of these should be selected to form the top, and they should be started from different points on the stem, on different sides and some inches apart. This is a matter of importance, for if all the main branches come out from the same point, there is danger of splitting when the tree matures. Early the following spring, before bud growth starts, all the new growth of the previous summer should be severely cut back.

Some growers advocate cutting back the leading branches to six inches and shorter and removing most of the laterals. Others, less severe, cut back not more than half of the growth and leave both branches and laterals much

longer. The former is probably the better method as it keeps the growth of new wood close to the trunk, and, by removing some of the laterals, it makes the head less dense. In both cases the general outline of the head should be borne in mind, and the tree pruned to form a well-shaped and symmetrical top. The following spring (two years from planting), the trees should be pruned in the same manner, but with less severity. The third spring, and for two or three years following, one-half of the previous year's growth should be cut off. As the trees grow older, less and less pruning will be required. Pruning should always be done in spring to avoid extra work on account of winterkilling. It is well to say here that some of the best growers prefer to reserve the severe shortening in for the second and third years, claiming that shortening in the first year tends to make the top too compact.

When pruning peach trees, we should have a definite ideal in our mind. No kind of tree need be pruned unless there is positively good reason for so doing. Usually a good reason is not difficult to find. We should prune to accomplish something. We should know what we want to accomplish and do it. Some pointers along this line are worth mentioning. Here are some of them, briefly stated: Peach trees inclined to grow very upward should be cut back to induce them to spread. The centre of the tree should be kept open to admit the sunlight and cause the fruit to color up and mature better. All superfluous, diseased and dead branches should be removed and no limbs should be allowed to rub or cross. Leave all wounds clean and smooth, with no long stubs, and paint those above one inch in diameter with either white lead or grafting wax; another good mixture for this purpose is gum shellac dissolved in one quart alcohol to thickness of paint. Growth may be directed by cutting back to a bud pointing in the direction we wish the branch to grow. The bearing wood of peach trees, the previous season's growth, should be kept near the base of the limbs to avoid long straggling branches. The fruitfulness of shy-bearing trees may be aided more or less by summer pruning, but this must be practised with caution.

The advisability of summer pruning admits of discussion. It is a problem yet unsolved, as very little experimental work has been done along that line. If done at the right time (i.e., immediately after the fruit buds have formed), it may bring good results, but if done earlier than this it is likely to produce an extra growth of the wood. Summer pruning young trees also is in an experimental stage. Light pruning at this time to correct bad habits in the young growing trees may be advisable. If such is practised, care should be taken not to remove the tufts of leaves and buds that spring from the base of the limbs as on these are borne the first crop of fruit. Later on these may be cut out if desired. Mr. J. H. Hale has practised summer pruning young trees but now thinks he gets larger trees without such attention. Mr. Hale says he gets larger and stronger trees by no summer pruning because the tree can produce rapid growing main branches more easily than it can send out laterals on a pruned limb. This is logical; think about it.

These few suggestions on pruning would be incomplete without some words on the relation of pruning to winter injury. The danger of winterkilling is obviated somewhat by the method of pruning already outlined,—pruning annually, cutting back one-half to two-thirds of the new growth, and maintaining low open-headed trees. This tends to prevent, however, not to cure. Trees that have suffered from winter injury must be more severely dealt with. Experiments were conducted by the Missouri Experiment Station (Bull. 55) to determine the effect of severe pruning upon trees

that were injured in both bud and wood. We should like to quote the results in full, but as space is limited we shall content ourselves with one extract only: "The best results were obtained by cutting trees of bearing age back into the two to four year old wood, the severity of the cutting depending upon the age and vigor of the tree. Trees pruned in this way have practically renewed their heads. Their wood has ripened up in good condition, despite the fact that they have made six, eight and even nine feet of new wood. The smaller twigs of this new wood carried enough fruit buds to promise a full crop of fruit the next summer."

Thinning the Fruit. Pruning the wood and thinning the fruit are allied processes. The practice of heading-in is virtually a thinning process, as it removes a portion of the bearing wood. Any system of pruning materially affects the productiveness of the tree in the following and succeeding seasons. To supplement the work of pruning, and to affect the productiveness of the current season, it is necessary to remove by hand the superfluous fruits. By thus directly picking the redundant fruits, some very important things are accomplished; the trees will not break or be injured from an over-burden of fruit; the trees will be stronger and more shapely; the crops of fruit will be more regular; the labor in culling will be reduced; and the fruit will be greatly improved in size, quality and appearance, and consequently will bring a much better price. Thinning also is a means of insurance against insect and fungous enemies as it not only destroys infested specimens, but, by stimulating the growth of foliage and twig, it enables the tree to better withstand such depredations.

To attain ideal results in thinning, it has been said that we should aim to allow one fruit spur to bear one year and another the next, and to so perform the thinning that the bearing and unbearing spurs will be alternate on the branches. Such an ideal is most desirable but seldom practicable. Ideals of this kind are imaginary things, as a rule, and ordinarily unattainable. Practical experience teaches us a more material mode of procedure. Let us return to it. Most varieties tend to overbear. These, in fact peaches in general, can scarcely be thinned too much. The tendency is to thin too little, if thinning is practised at all. Many growers think the operation is expensive. Possibly it is at the time of thinning when the orchard is making no returns, but after-profits and increase in profits fully compensate for the early expenditure. Undoubtedly thinning pays when the trees are heavily laden. The fact that thinning is practised annually as a recognized and essential part of orchard work in the largest and most paying orchards on this continent, notably some in Michigan, and others in Georgia, of one to two thousand acres in extent, should be sufficient to convince the most sceptical that *it pays to thin.*

Peaches should be thinned as soon as the fruit is nicely formed and before the seeds commence to harden. The usual custom is to thin soon after the so-called "June drop," which takes place when the peaches are about the size of marbles. All diseased, stung, distorted and injured specimens should be picked off, regardless of position. A sufficient number of others should be removed so as to leave on the trees the best specimens, not less than five or six inches apart. The best grade of fruit is obtained when no more than three or four peaches are left on a fruiting branch, the previous year's growth.

Top Working Bearing Trees. When the varieties that have been planted are not suited to local and climatic conditions, or to the demands of the market, it is advisable to work them over with some variety of desired merit. This is best done by means of top-budding.

Buds may be successfully set in old wood, but to secure more certain results it is necessary to bud on wood of one season's growth. To get such, the main branches are cut back in winter to within one and a half feet of the trunk. The following season a new growth will spring from the stubs, and this may be utilized for the desired purpose. If the growth has been superfluous, only a portion of the new shoots need be budded. It may be advisable, however, to bud more than eventually will be required, so as to insure a sufficient number of perfect unions. All unions in excess of the desired number, which is usually four or five, may be removed when growth starts the following spring.

The time for budding is in August, and the process is similar to the one suggested for nursery practice. The bud should remain dormant over winter. In spring, as soon as the bud shows signs of growth, the top of the stock must be cut back close to the bud, and all other branches should be removed. By this means, a new and profitable top may be secured.

Insects. The scope of this article demands a few words on the insect enemies of the peach, but as the subject of insects is sufficient in itself to supply material for a whole bulletin, we are compelled to content ourselves with nothing more than a passing mention. Information regarding the identification, habits and treatment of peach insects may be had by applying to the Department of Agriculture, Toronto, or to the Biological Department, Ontario Agricultural College, Guelph. The following key to peach insects, prepared by Prof. Wm. Lochhead, Macdonald College, St. Anne de Bellevue, Que., and formerly of the O.A.C., Guelph, we reproduce in full:—

Key to Peach Insects.

A. *Attacking the Root and Lower Trunk*:

1. Tunneling in the bark and sap-wood of the root, causing the exudation of gum, which is seen at the base of the tree mingled with the castings. Peach Tree Borer (*Sannina exitiosa*).

B. *Attacking the Trunk and Branches*:

1. In early spring a minute caterpillar bores into the shoots of new leaves, killing the growing terminals. Peach Twig-Borer. (*Anarsia Lineatella*).
2. Black hemispherical scales attached to the bark. Peach Tree Lecanium (*Lecanium persicæ*).
3. A beetle eating the buds, and gnawing into the base of the twigs, causing them to break and fall. New York Weevil (*Ithycerus noveboracensis*).
4. Round scales, gray or black, twigs presenting a scurfy appearance. San José Scale (*Aspidiotus perniciosus*).
5. Oval scars and longitudinal slits on back. Buffalo Tree-Hopper (*Ceresa bubalus*).

C. *Attacking the Leaves*:

1. Plant lice, living in colonies under the leaves, causing them to thicken and curl. Peach Tree Aphis (*Myzus persicae*).
2. Minute round scales, usually along the veins. San José Scale (*Aspidiotus perniciosus*).
3. Caterpillars protected.
   (*a*) In a tortuous tube. Leaf Crumpler (*Phycis indiginella*).
   (*b*) In folded leaves. Oblique Banded Leaf-roller (*Cacoecia rosaceana*).

D. *Attacking the Fruit*:

1. Long legged, yellowish beetles eating holes in half-grown peaches. Rose-chafer (*Macrodactylus subspinosus*).
2. Large yellow hairy beetles, eating holes in ripe peaches. Bumble-flower Beetle (*Euphoria inda*).
3. Small snout-beetles making a puncture and crescent in the young fruit. Plum Curculio (*Conotrachelus nenuphar*).

Diseases. The diseases of the peach are numerous, and some of them quite hard to deal with. The most important in this Province are brown rot, leaf curl, and yellows. Details of information regarding these may be had by applying to the authorities spoken of under the preceding heading. As with insects, we must limit our remarks upon diseases to merely a list.

The following key to peach diseases was prepared also by Prof. Lochhead, specially for this bulletin:

Key to Peach Diseases.

A. *The Roots.*
- (*a*) Soft corky enlargements usually at the crown of the root, causing the death of the trees before they have attained full growth. Crown Gall (*Dendrophagus globusus*, Toumey).

B. *The Stem and Branches.*
- (*a*) The buds unfold prematurely and the new shoots become slender, sickly and yellow. The Yellows.
- (*b*) The buds form compact tufts or rosettes, containing one or two hundred leaves, which are yellowish green. The Rosette.
- (*c*) A copious outflow of gum upon the twigs and branches usually from spots near the buds. Gummosis or Gum Flow.
- (*d*) New shoots become thickened and enlarged. Leaf-Curl (*Exoascus deformans*).
- (*e*) Winter buds do not sprout as in the case of Yellows; leaves dwarfed and yellow from the first. Little Peach.

C. *The Leaves.*
- (*a*) In May and June the leaves curl up, become deformed, much thickened and pale yellowish green, then rosy or purplish in color. Affected trees lose their leaves before midsummer. Leaf Curl (*Exoascus deformans*).
- (*b*) Numerous minute brown spots on the under surface of the leaves which fall early. Peach Rust (*Puccinia pruni-spinosæ*).
- (*c*) Minute purplish spots appear; later, the tissue dies, and minute holes like shot-holes appear in the leaf. Shot-Hole Fungus (*Cylindrosporium padi*).
- (*d*) A white mildew appears on the leaves. Rose Mildew (*Sphaerotheca pannosa*).
- (*e*) White mould-like growth, causing the leaves to become hard and curled. Peach Mildew (*Podosphaera oxyacanthæ*).

D. *The Fruit.*
- (*a*) Scattered tufts of a brownish mould first appear, followed by a soft rot. Later the fruit dries, and may remain on the tree over winter as "mummies." Brown Rot (*Monilia fructigena*).
- (*b*) Sooty-black spots or patches on the fruit, often accompanied with cracks. Peach Scab (*Cladosporium carpophilum*).
- (*c*) Minute light-brown, velvety spots with a reddish border, frequently resembling minute pustules. Brown or Pustular Spot (*Helminthosporium carporphilum*).
- (*d*) Large light-colored spots with formation of many hairs or fuzz: Under these spots the flesh becomes hard. Rose Mildew (*Sphaerotheca pannosa*).
- (*e*) Irregular, mouldy patches on the surface, followed by a cracking of the fruit. Peach Mildew (*Podosphæra oxyacanthæ*).
- (*f*) Tardy ripening of the fruit, which is dwarfed in size; no red spotting of skin or flesh. Little Peach.
- (*g*) Premature ripening of the fruit, which is r d spotted and streaked. The Yellows.

Some Thoughts on Spraying. Although we have requested the reader to look elsewhere for information regarding insects and diseases, and the best means of combatting them, we shall consider here for a moment a few thoughts on spraying. Spraying is a means to an end. In peach growing, the end in view is to produce in quantity a grade of peaches that approaches as near as possible the ideal looked for in the particular variety or varieties grown. Spraying helps the grower to do this. It increases the percentage of high grade fruit by holding within bounds the ravages of the aforementioned insect and fungous enemies.

To spray intelligently, we must study the enemies to be warred against. The time to spray, and the method of treatment depends entirely upon the particular case at hand. We must know definitely the peculiarities and the vulnerable points in the life cycle of the pest to be treated. Besides this, a well informed orchardist must be somewhat familiar with the chemistry of insecticides and fungicides.

A knowledge of insects is important because many of them necessitate peculiar methods of treatment. Insects that work beneath the soil, or those that work within the wood require remedial measures different to those adopted for surface working insects. Other cases also requiring special attention might be mentioned. As a general thing, however, remedial measures are determined by classifying insects into two groups, viz., sucking and biting. For sucking insects, some substance is used which will kill by contact, either as a caustic or by closing the breathing pores and smothering. Biting insects are treated by direct poisons, which may be applied to the plant, and which will be swallowed by the insect. For both classes, certain obnoxious substances used as repellant are sometimes valuable.

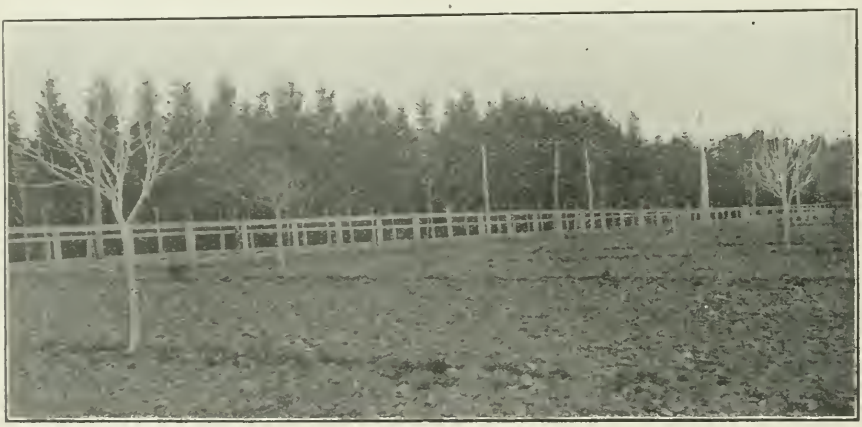


Fig. 5. Trees sprayed with lime for winter protection, O. A. C., Guelph.

The vulnerable spot in the life history of fungi is usually found in the spore. These are produced at different times by the various species of fungi and are disseminated in many ways, and some species are quite difficult to combat. For these reasons, the treatment must be largely preventive, not curative. The work of applying the fungicide must be done thoroughly and at a proper time. Every portion of the leaf and branch must be covered with the spray. The number of applications depends upon atmospheric conditions. Dry weather is unfavorable to the growth of most fungi, moisture affording more congenial conditions.

To spray effectively, proper apparatus must be used, and to spray economically the best of apparatus is none too good. Apparatus should be selected that is thoroughly adapted to the work, simple and strong in construction, and easy to operate. The fittings with which the spraying mixture comes in contact should be of brass. As part of the fittings, there must be a good agitator to keep the mixture stirred. Many styles of spray

pumps are on the market. One cannot say which is the best. When buying, we should select one that is strong and durable, efficient and cheap. While the cheapest is not always the best nor the best always the cheapest it is not particularly gratifying to find that we have paid more than the pump is worth, even though a good one. Next to the pump itself is the nozzle, and probably it is the more important of the two, as upon it depends the thoroughness and economy of the operation of spraying. The best nozzle, it has been said, is one that will give the finest possible spray with the greatest possible force. It also should be durable, strong and efficient, and not subject to clogging.

Fig. 6. Unwhitened and whitened Flemish Beauty pear trees, O.A.C., Guelph.

Winter Protection. Outside of the peach belt of Ontario, the Niagara District and that portion of the Province fringing on the Great Lakes—the growing of peaches as an industry has many drawbacks. Even in favored sections, peach growing is attended with many difficulties. The cold winter, the lateness of spring, and the tenderness of the peach tree make difficult its culture. To overcome to a certain extent these difficulties, the grower must acquaint himself with the best methods for protecting the trees in winter. Some are already familiar with this phase of the question; others are not, so a few suggestions along this line may be of value.

The most serious hindrance to successful peach culture in Ontario is the winter-killing of the fruit-buds. In some parts of the Province good crops of peaches are grown with very little winter protection. In other

portions, however, it is absolutely essential to protect the tender buds in winter. Our changeable climate makes the question of winter protection important in all parts of the Province.

Winter-killing is attributed to various causes, some of which are: (1) immaturity of the wood and buds in fall, due to late cultivation, excessive use of nitrogenous fertilizers, or warm autumn rains; (2) severe and continued freezing is sometimes directly responsible; (3) sudden changes of temperature, causing sudden thawing and sudden freezing; (4) swelling of buds during warm days in winter, and subsequent freezing; (5) an excess of humidity in the soil which is apt to favor the premature flowing of the sap in early spring; and (6) an unfavorable exposure.

Probably the most practical methods of protecting peach trees are wrapping (*i.e.*, closely drawing together the branches, and wrapping with cornstalks, straw or canvas), and whitewashing. Layering, or laying down the trees in autumn, and covering with soil, spruce boughs

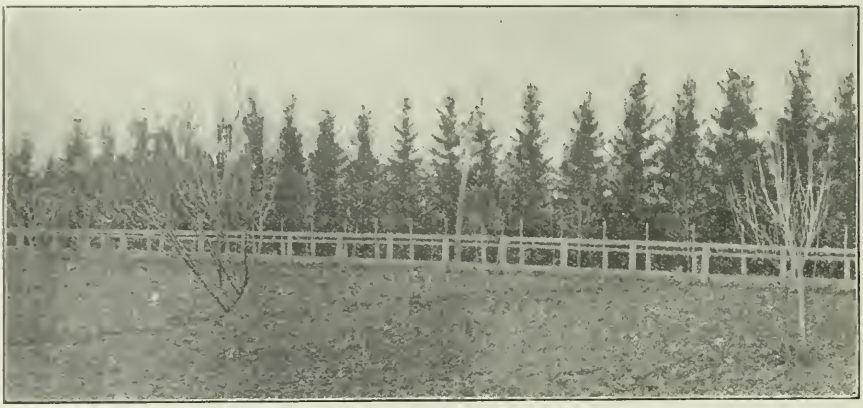


Fig. 7. Peach trees unsprayed and sprayed in young orchard, O.A.C., Guelph.

or other material, is resorted to with more or less success, but is, under most conditions, a rather laborious and expensive practice. Whitewashing the branches and buds, being of more recent introduction, has not yet received the attention its merits deserve. It is, neverthless, the most promising means of winter protection yet suggested. Whitewashing retards the bloom, as heat is reflected by whitened buds, rather than absorbed. Experiments have been conducted along this line by Prof. J. C. Whitten, Horticulturist at the Missouri Experiment Station, also, by W. M. Orr, Fruitland, a prominent Ontario fruit grower, and by W. T. Macoun, Central Experimental Farm, Ottawa. Peach buds are known to swell and start into growth during warm spells in late winter and early spring. In explanation of this, Bailey says: "The bursting vegetation of springtime is supported by a local store of nutriment, and is more or less independent of root action." An erroneous idea regarding this fact exists among certain fruit growers, some of whom believe that buds cannot swell or grow while the roots remain frozen or dormant. Both direct experiment, and the study of plant physiology, prove this to be untrue.

Regarding the experiments at Missouri, Prof. Whitten says: "Whitened buds remained practically dormant until April, when unprotected buds swelled perceptibly during warm days late in February and early in

March. Whitened buds blossomed three to six days later than unprotected buds. Eighty per cent. of whitened buds passed the winter safely, when only twenty per cent. of unwhitened buds passed the winter unharmed."

Mr. Orr's experiments also showed that sprayed trees were later in blooming than those untreated. The tests made at Ottawa confirm these, and in addition it was found that spraying with lime was effective, to a great extent, in killing the oyster-shell bark-louse. It is also claimed that whitewashing in winter will greatly lessen the damage done on different classes of fruits by such insects as the borers, and by fungous diseases, such as the peach curl.

The use of the lime-sulphur wash also has an effect in delaying the blooming period, but, as it is not applied until early spring, its value in this respect is not marked. Before the customary time for applying this wash, peach and other tender trees are liable to injury. For purposes of winter protection, a lime wash must be applied earlier in the season.

FIG. 8. Apple trees in young orchard, O.A.C., Guelph. Unsprayed buds of tree in foreground, bursting into growth. Sprayed trees dormant.

Whitewashing should be done early in winter: apply two coats and repeat as often as required to keep the trees white. The following formula was used in some confirmatory experiments, conducted by the writer at Guelph during the winter of 1901-02, and gave good results:

Lime	2 lbs.
Water	1 gal.
Skim milk	1 qt.
Salt	5 ozs.

Slake the lime in warm water, stir to slake quickly and well, add remainder of ingredients and mix thoroughly. Then strain through a sieve, having a mesh of one-twelfth of an inch in diameter. Apply when hot with a spray pump, fitted with a Bordeaux nozzle. Amount necessary, averages one gallon to a tree at each spraying; time required to apply, five to ten minutes; cost, eight to ten cents per tree for the winter. A brief account of the work in winter spraying at Guelph will be found near the end of this article.

HARVESTING AND MARKETING THE PRODUCT.

Picking. Numerous system of paying pickers are practised. One grower pays by the day, another by the crate, another by the average, and others by something else. There is no uniform system of payment employed in this or any other country. Perhaps such is not necessary. The one outlined below was noted by the writer when in Georgia, and could be adopted by Ontario growers with advantage: Before leaving for the orchard in the morning, each picker is given a sack containing a number of tickets, each ticket bearing the number of the picker to whom it belongs. In the orchard, the picker places a ticket in each basket of peaches that he picks. When the fruit reaches the grader in the shed, he takes care of the tickets he finds in the bottom of the baskets and gives them to the time-keeper.

The time-keeper credits the grader with the quantity of tickets that he (the grader) has gathered from the baskets, and credits the pickers with the quantity of tickets received bearing that individual picker's number; hence, one lot of tickets suffices for both pickers and graders. The pickers (packers and graders also) are paid so much per day with advantage of increase over average number of baskets picked, or crates packed during the day.

For example, at the Hale orchards, the packers are paid one dollar for the average number of crates that day. If the average for the day happens to be fifty crates, each packer receives two cents per crate for the work he has done. The packer who has packed over 50 (the average) is paid at the rate of two cents per crate, and the one who has packed less than the average, receives a corresponding decrease. The following day the variety and grade of peaches being packed, may be larger or smaller, as the case may be; if the former, the average will be higher and the packers will receive a lower rate per crate, or if the latter, a relatively low average will be the result, and a correspondingly high rate per crate.

This system of paying the fruit workers,—known as the "average system,"—is satisfactory both to employer and employee. The former gets more work done for less money than he could by any other system of payment, and the employee who is a little better than the other fellow, feels that his efforts are being substantially recognized. Personally, I may say that at first I thought the system unfair to the employee, and it certainly would be if all the packers were experts, as then the average always would be high; but, after talking with the packers, I found that all appeared to be pleased and satisfied with the method, on account of the fact that from day to day throughout the season new and inexperienced hands are employed, who tend to keep down the average, and enable thereby the best workers to make a good showing above the average for the day.

To fully estimate the advantage of the system to the employer, I noted, on a particular day, the difference between the results of this system and those of a system practiced on a neighboring orchard.

Hale's—150 crates for $1.00 (average system).

Neighbor—40 crates for $1.00 (day system).

I have referred to the packers and packing for convenience in explaining the system, not because they alone are paid in this way. Such is not the case, as the same method is used in paying the pickers and the graders, and with the same degree of satisfaction and success.

The pickers are handled in the orchard as follows: Over every twenty-five pickers is one foreman, with assistant if necessary. To prevent delay, each picker carries a couple of baskets to the orchard, where they are started picking, one picker to a row. When picking, a ticket is first placed in the basket, then the peaches, and when the basket is full it is left under the tree. The baskets are then carried by boys to convenient places for loading on single horse orchard wagons, (known in Georgia as "Dunkirks"), which go about among the trees gathering up the baskets and carrying them to the avenues where they are transferred to larger waggons or lorreys ("floats") that ply between the orchard and the packing shed.

These lorreys leave the barns loaded with empty baskets in the morning. In the orchard, the empties are distributed by basket boys, who

FIG. 9. No ladders are required to pick peaches from low-headed trees.

should keep ahead of the pickers to prevent loss of time. Four or five basket boys are required for twenty-five pickers. Two boys are also employed to keep pickers supplied with drinking water. This is merely an outline of the orchard practice, and may not be suited to all conditions, as at all times and in all orchards it is necessary to adjust labor to suit existing circumstances.

The trees are gone over two or three times to get the fruit at the proper stage of maturity. Practice soon teaches the pickers the proper stage for picking. In general, the fruit is in the right condition when it is full grown, but yet firm, and when the ground color takes on a faint yellowish tinge.

The opinion is commonly held by many growers, that peaches should be picked on the green side of maturity, to insure the best keeping quality. Investigations show this opinion to be erroneous. Experience teaches that peaches keep best when picked fully matured, full grown, well colored, yet

firm, but by no means either ripe or green. Peaches that are picked too green will shrink rather than ripen, and they never attain their proper flavor.

Regarding this question, Prof. G. H. Powell, Pomologist in Charge Fruit Storage Investigations, Washington, D.C., says: "In our fruit investigations we have observed that after green fruit is picked, it ripens more quickly than more mature fruit of the same variety, and the chemical changes have been shown to progress more rapidly. Green picked fruit, therefore, reaches the end of its life in the warehouse (or car, when in transit) as quickly, or even more so than the latter. Poorly colored fruit brings the lowest price: it does not attract the customer; it never acquires that exquisite bouquet, or aroma, or that fine quality that is characteristic of a highly colored, well-matured specimen."

There is another point in connection with the picking of peaches that deserves attention, and, judging from my observations, a word of caution. Oftentimes on display in the market, we see peaches, originally

Fig. 10. Picking Baskets and Carrier of second grade Elbertas, showing a 2-1 pack.

high grade, showing the effects of bad handling. This condition may be due to poor methods of picking, or to subsequent rough handling on the market stand. If the trouble is to be found in the orchard, it should be remedied. Picking methods, for good results, demand that the fruit be handled more like eggs than potatoes. The picker must be careful to grasp the peaches very lightly, and to drop them into the basket with care, or he will bruise them and cause them to become discolored. Peaches should be handled tenderly and as little as possible, for every evidence of careless handling detracts from both their market and shipping value.

Grading. Nowhere in America, perhaps, is there a more perfect system of handling peaches than that practised in the Hale orchards. Their methods of picking, packing and selling are most worthy of being adopted in the orchards of Ontario and elsewhere. For this reason, we shall refer to their methods somewhat fully in our remarks upon these phases of the industry, adapting them, however, as far as possible to our own conditions. The system of grading and sorting is as methodical as the system of picking. Each packer has a grader, who grades the peaches according to size and variety. Each variety is usually assorted into three grades, each grade being marked in accordance with the grade mark chosen by the grower a

there has been no uniform marks adopted as yet in Georgia. Hale marks the first grade, extra fancy; second, fancy; the third, the name of the variety only. Thus:

No. 1	X Fancy Elberta
No. 2	Fancy Elberta
No. 3	Elberta

The graders are constantly watched and instructed by experts. All ill-shaped, bruised, rotten and very small peaches are thrown out and sent to the distillery. The best of them may be used in cannery or evaporating plant.

As a rule, the Georgia grower prefers hand grading to machines. Mr. S. H. Rumph, of Marshallville, Ga., the originator of the Elberta, favors the mechanical grader and has a number of them in operation that do very good work. They are made by Messrs. Maul & Miller, Crescent City, Florida. Personally, I noted that this particular grader was all-right as far as the assortment of sizes was concerned, but it failed to reject the bruised and bad-shaped fruit, and besides, I was rather disappointed with its speed. I shall not presume to condemn it, however, as I may not have seen it under favorable conditions. Hale says this is probably the best grader made, but all are unsatisfactory.

Under the head of picking, we considered the method of keeping tally with, and paying, the graders.

Packing. Mr. Hale uses different packs for the different varieties and grades, the size of the peach determining the pack to use, and all his peaches are packed in the standard six-basket Georgia carrier. As it is rather difficult to explain in writing the various packs used, the reader is referred to the accompanying cuts for a fuller understanding.

For sizes or grades that make *three layers* in a basket or "cup" of the carrier, a 2-2, a 3-2, or a 3-3 pack may be used. For *four layers*, a 4-3 or 4-4 pack can be used, but it seldom pays to systematically pack peaches of this size. For *two layers* (usually first grade), it is best and necessary in most cases to use a 2-1 pack, although sometimes to make the cup high enough, it is necessary to place the bottom layer on end. Packing on end, however, is resorted to very seldom. It is a bad practise. Rather than pack on end, it is better to change the pack, using three layers and a corresponding system that will bring the peaches to the right height.

The carriers used for grades Nos. 1 and 2 are neatly labelled. No. 3 goes into plain crates, having no mark other than the name of the variety. In all of them the peaches are firmly packed to prevent change of position and bruising while in transit. The rosy cheek of the peach is placed uppermost, and the peaches are all pointed the same way in the cup. When the carrier is filled the packer puts his ticket on it and sends it to the nailing table where it is inspected. If found satisfactory, the cover is nailed on immediately and it is carried to the car; if not packed to suit the inspector, it is sent back to be re-packed by the packer, whose number corresponds to the number found on the ticket.

Some growers use what is termed a "spring" pack; *i.e.*, a full layer on the bottom of the cup, a partial layer in the centre and another full one on top. In reality, it is a false pack, and one that is unsatisfactory as it is liable to become loose before it reaches the market. Other growers use a two layer pack with both layers on end. Peaches packed in this manner are apt to become crushed through pressure of the crate top on the tender

end of the peach. In the Hale orchards, peachers are packed on end only when absolutely necessary and that is seldom; in Ontario, in our Climax basket, it is the universal practise to pack on end and this practise should be condemned.

The point or apex of the peach is the most tender part of the fruit, as it ripens first; hence, when peaches are packed on end they are apt—almost sure—to become crushed by the pressure of the upper layers, and when the baskets are piled, by the weight of the upper tiers. Probably the unsuitableness of the Climax basket for fancy packing is one of the reasons why the Ontario grower packs peaches on end. And this leads to a few thoughts on another phase of our subject.

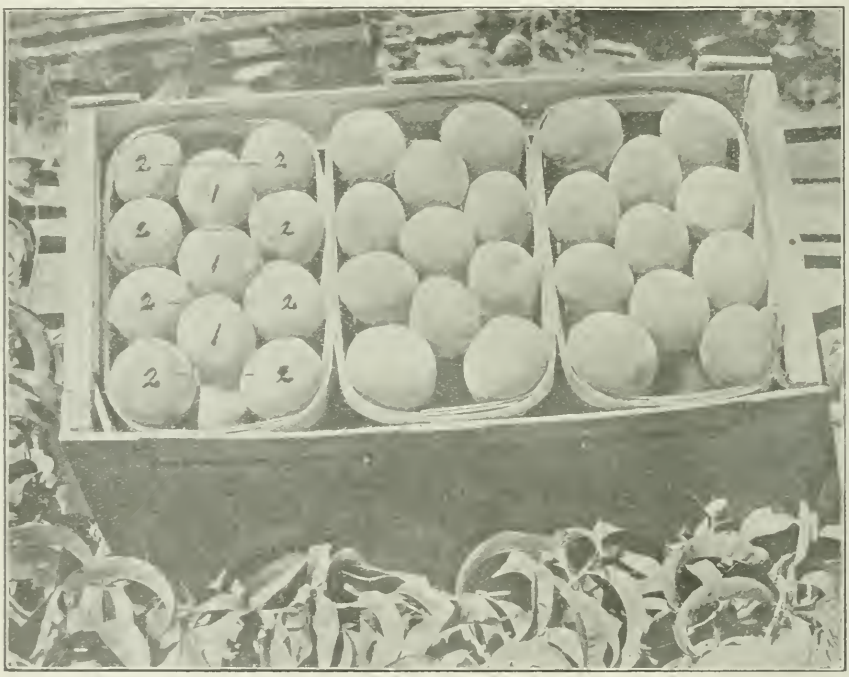


Fig. 11. Elbertas, in Georgia carrier, showing a 2-1 pack.

The oftener I see and study the behavior of peaches in the Climax basket, the less favorably impressed I am with its utility as a package for high-grade and fancy fruit. It certainly is a most satisfactory package for some kinds and grades, but for all classes and grades that require systematic packing, or "laying up" as some people call it, it is "not in it" with the Georgia carrier, and some of the other styles of packages used in other countries. The Climax basket is not adapted to fancy packing. The top is not properly covered to keep any one of the various packs firmly in position. The sides and handles of the basket are not sufficiently rigid to admit of any pack other than what would be termed in Georgia or California a straight 4-4, three-layer pack. This is the simplest of all the peach packs and apparently it is the only one known to most of the packers I have seen at work in our peach districts. The cause is easily found. While a score of different packs can be put in the Climax basket, the foregoing is

the only one that reasonably can be expected to keep its place. The practice of spreading the handle when the cover is put on, loosens the fruit and, as a consequence, a fancy pack would be spoiled. Even the customary 4-4 pack often reaches its destination in a disordered state. The Climax basket is objectionable also, in the fact that the flimsy leno cover permits tampering with the fruit, and also allows dust and dirt to enter. One of the first needs of our fruit industry to-day is a better package and better packing for our fancy fruits. I personally would recommend for peaches, the adoption of the six-basket carrier at present so largely used in nearly all states of the Union, and which I shall attempt to describe under the following heading.

Packages. In Georgia they use a light carrier containing six baskets, holding four quarts each. It is a very strong package, gives good ventilation, is neat in appearance, and costs only 12 cents with the divider, six baskets and cover. The best type of carrier is one that is put together with strong wire staples well clinched on the inside, and is made by the Georgia Fruit Package Co., Fort Valley, Ga. The panel heads afford a secure grip to the hands, and damage from breakage rarely occurs. When loaded in cars, the shape of the package permits a perfect fit; the tiers are separated for ventilation by means of inch slats tacked across the ends of the packages. This package is worthy of universal adoption. Michigan uses it for her best grades of peaches. Nearly all the southern states have adopted it. Texas, a coming peach state, and where to-day thousands of acres are being planted, adopted it at the outset. In Canada, where no uniform peach and plum package has yet been adopted, it should receive the closest examination and the consideration of each and every grower. Even though it might cost more to make it in Ontario than in Georgia, the package would be cheap at twice the price mentioned.

In the economics of fruit marketing, the package plays a most important part, and a uniform package should be used. Sometimes, when a man handles peaches solely upon his own account, and for a local fancy market, he can advertise his goods with advantage by adopting a package unlike those in common use. As an illustration of a most unique and striking package, something decidedly out of the ordinary, it may be interesting to mention one originated and used by the proprietors of a large fruit house in Buenos Ayres, Argentine Republic, where the writer spent some months during 1904 and 1905. This package is made of a species of swamp grass or rush, fitted in a skeleton framework of wood. The rushes are placed side by side and fastened at both ends, and in the middle, by strands of light wire. The light framework of wood which encloses the inner rush package is stained crimson or some other color that is attractive. This package may be made any size; it gives good ventilation; is neat in appearance; lessens the danger of bruising to the lowest degree; is easily handled; and is strong enough for its purpose;—a local fancy trade with private customers; but it has no place in the list of packages for export or for even the general home market. It is mentioned here for the benefit of the few who may have occasion to use a package of this type. The adoption of un-uniform styles of packages, however, may be carried too far and lead to confusion. It is imperative to the success of our peach industry that a uniform package be used.

For foreign shipments, different styles of packages have been used, and others are constantly being tested. So much depends upon the condition and particular grade of fruit, and upon the available means of transportation, and very much also depends upon the demands of the market to be

catered for, that I shall not now presume to mention others than the carrier and a very good package that is extensively used in some peach sections of the United States and Canada, shown in Fig. 12.

Wrapping. Experience is teaching growers that it pays to wrap peaches. It prevents bruising and the spread of brown rot (*Monilia*), adds to the appearance of the package, and above all, it increases the profits. Trial shipments from Georgia have brought fifty cents per carrier more than for unwrapped. This is worth considering when the extra cost to wrap a carrier amounts to no more than six cents. Fairly heavy paper has given better results than tissue paper.

FIG. 12. Peaches for export unwrapped, showing three styles of packs.

One report from New York stated that in carriers that contained unwrapped peaches, 10 to 15 per cent. were bad, while only 5 per cent. were bad in carriers that were wrapped. Similar reports have been received from Winnipeg with respect to peaches shipped there from the Niagara district.

Wrapping seems to add or bring out the color. Mr. Hale says: "Wrapping is decidedly the best caper for soundness and color." From now on he expects to wrap a large portion of his output. Other growers in Georgia, many in other States, and the leading shippers in Canada, are doing the same.

In cold storage, the effect of wrapping is not so noticeable on peaches as on other classes of fruit, mainly because peaches as a rule are not stored long enough for any advantages to be well marked. Experiments show, however, that wrapped peaches retain their firmness and brightness longer and are less apt to show a discoloration of their compressed sides when removed.

Shipping and Selling. After fruit has been packed for market, the next thing is to get it to its destination in the best possible condition at the least possible cost. This is the actual transportation problem and it involves many minor problems of more or less importance in themselves—whether or

not peaches should be cooled before shipment; the question of a proper system of refrigerator cars and railway facilities for shipment to the local market, the North-West market, or to the seaboard for export; the proper means of transferring shipments from car to steamship, when foreign consignments are in transit; the advisability of official inspection at the wharf; ocean transportation, including refrigeration, with adequate ventilation and thermographs for registering the fluctuations of temperature; and finally, the handling and disposal of the fruit on the market, at home or abroad. These are questions that require expert study and investigation. Both Dominion and Provincial Governments are doing excellent work in these directions, not so much with peaches perhaps as with apples and pears, but there is no reason why our peaches cannot be placed on the English markets. The authorities at Washington have shipped peaches to England with success. The Ontario grower can do likewise, even though a few trial shipments have not proved satisfactory. The solutions of the problems mentioned above

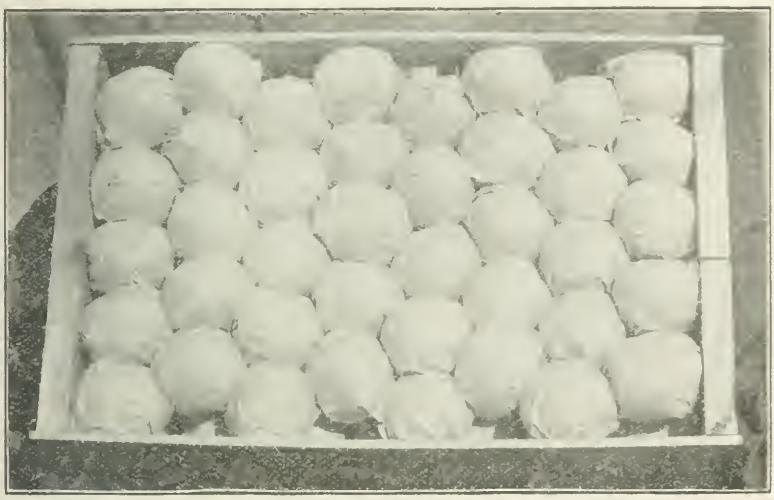


Fig. 13. Peaches wrapped for export.

rests as much with the grower as with the government. Many prominent fruit men are, by individual or collective means, aiding the government to solve these problems. Others, however, fail to recognize the fact that the successful transportation and marketing of peaches is dependent largely upon the quality of the work that has been put upon the orchards, and upon the preparation of the fruit for shipping. No system of transportation can insure the safe delivery of peaches that have been handed over for transportation in a condition unfit for safe carriage. The problem of transportation begins with the picking of the fruit and involves all operations in succession from the tree to the consumer.

At the Hale orchards the carriers are loaded into the cars at the packing house and through trains carry them to New York and all points in the north. A fast schedule is arranged for these trains to deliver the fruit on the market in the best possible condition. The cars are iced three times between Fort Valley and New York. These cars are forty feet in length and when loaded about two-thirds full, five tiers high, they carry 560 carriers; in wet seasons, the number is reduced one tier.

There are many different types of refrigerator cars now in use, some with the ice chambers on the end, some iced over head and others iced in various ways; none are entirely satisfactory. The objection to them lies not so much in the method of icing, as in the lack of proper ventilation, and, as a consequence, it is difficult to maintain an even temperature. Investigations show that different temperature are found in different styles of cars and in cars of the same style. As a rule, the temperature at the top of the car ranges ten degrees higher than that at the bottom. This, aided by the moisture thrown off from the fresh peaches, is favorable to the spread of brown rot (*Monilia*), and should be remedied. Quick refrigeration is essential to prevent the spread of this fungus, which can do so much damage in 24 hours.

No refrigerator car yet constructed, whether in Canada or the United States, can give quick refrigeration. For this reason, it is advisable, when possible, to have the fruit cooled before it enters the car. Furthermore, the fruit can be picked in better condition, riper and more mature. A local cold storage plant, adjoining packing house, into which the fruit could be placed and cooled before it goes into the car, should be considered a part of the equipment of our up-to-date orchards. Such is feasible, however, only on large plantations or in connection with co-operative central packing houses.

Safe commerce in fruits depends upon the quality and appearance of the commodity that we have to offer and upon the value that we may get for it. High grade peaches are always in demand. It is only the inferior grades that go begging for a market. What the market wants first of all is soundness and good-keeping qualities, and nearly uniform size throughout the package. Uniformity in appearance and size means a good deal. It means the difference between high and low prices. To secure uniformity in packing from any one particular locality by individual shipments is an impossibility. The solution of the question lies in co-operation.

The Ontario peach industry is reaching that stage where individual effort must give way to co-operation. The ordinary individual alone cannot command the same attention and the same market that he can when working in company with others. Of course, a co-operative shipping association has its disadvantages as well as its advantages. The difficulty of maintaining a uniform grade is one of its most serious drawbacks, but this can be overcome by co-operating earlier in the game. The best system of co-operation begins in the orchard, or if this is not practicable, co-operative packing is. Unless the packing and grading of peaches is superintended by one man it is impossible to secure uniformity. A co-operative association organized solely for the purpose of selling is all right in theory, but in practice it is usually found wanting. To insure success in co-operation, the association must control the packing as well as the selling. Such an association has many advantages. A better distribution of the crop is secured. The association is in a better position than the individual to keep in touch with the needs of the market, and, as a consequence, "gluts" are less likely to occur. Salesmen can be employed who will sell the fruit to the best advantage. Uniformity in packing and in packages can be had. Men can be hired and fruit packages can be bought to better advantage. Better and cheaper storage and transportation can be secured. Higher prices and better markets can be commanded by controlling the output. The profits of the middle or commission man can largely be done away with.

Shipping and selling on commission is a most unsatisfactory way of marketing peaches. There are times and seasons, however, when it is necessary to sell in this way. In such circumstances, the peach grower individually or collectively should ship to only one commission house in the same market. By so doing, he will not compete against himself, and, by careful grading and honest packing, his fruit often may be sold before it reaches the market. He should keep in close touch with his commission man and the market generally. He also should use a private telegraph code to make communications secret and to lessen the expense of telegraphing.

Some markets prefer a yellow-fleshed peach to a white and *vice versa*. Large peaches do not always bring the most money; sometimes they bring less. On many occasions I have known cases of second-grade Elbertas to bring twenty-five cents more than the one day's quotation for first-grade.

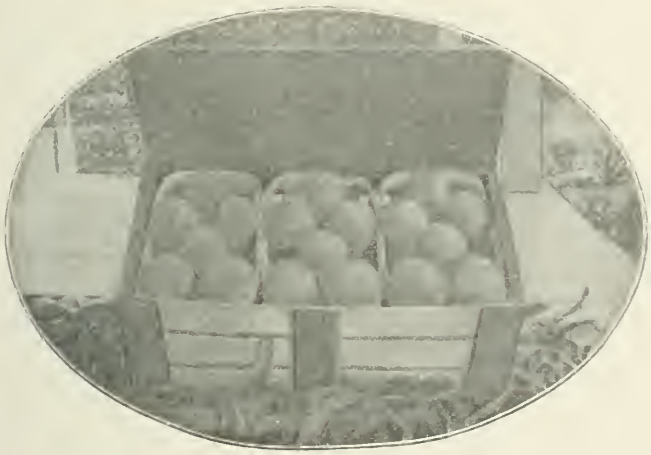


FIG. 14.—It requires thrift, industry and intelligence to grow peaches like these. Seventy-two bouncers to a carrier.

THE SURPLUS AND BY-PRODUCTS.

Gluts in the Market. The purpose of this section of our article on the peach industry is to offer a few suggestions that may help the orchardist to overcome a very serious cause of loss in successful peach culture, a drawback that affects, in seasons of abundant crops, the entire peach growing area of the Province, viz., the occasional demoralizing "gluts" or "slumps" in the market that break down prices and discourage growers, old and new alike. Naturally, the question might arise: What is the cause of such gluts in the market? Are they the result of over-production? Economists say that there is no over-production of any article so long as there is a person in the world in need of such article. Such is rather a broad view of the situation; yet, when we follow their argument further and attribute the fault to the lack of proper distribution, rather than consider it the result of over-production, the force of the thought is apparent. The crying need of the peach industry is for a system of distribution that will insure a greater demand for our produce, and, as a consequence, better prices.

Just how to establish a well organized system of distribution is a difficult problem to solve. It is a noticeable fact that, when slumps occur in large cities, there often are smaller towns where peaches cannot be bought at any price. Probably the solution of the problem lies in co-operation. Some arrangement with dealers in small towns by which they may communicate their needs to the larger dealers of the cities, and through the latter to the peach growing centres, would certainly tend to lessen the difficulty. By this means, the empty and full markets could be located and shipments consigned accordingly.

Another way to avoid gluts in the market lies in co-operation with the railway lines. To place peaches on distant markets in good condition we require a better system of refrigerator cars and quicker transportation than are now at our command. The objection to the present styles of cars was noted under the heading of shipping. To better the condition of things in this respect, railway lines should be asked to supply a class of cars adapted in all respects to the requirements of the perishable peach. A fast schedule for such cars should also be asked for, or rather it should be demanded, as peaches cannot be handled as ordinary freight and reach the market in prime condition. And, to reciprocate, peach growers must ship regularly and in quantities sufficiently large to make it worth while for the railway companies to meet these demands.

An apparent local over-production of peaches is due sometimes to faulty methods of marketing. A good article, true to name and grade, and put up in clean and uniform packages, always brings a good price in any market. Poor fruit, dishonestly graded and packed in packages scarcely fit for potatoes, is difficult to sell at any time. As a rule, the grower who offers for sale a class of peaches that is a little better than the other fellow's, will find a ready demand for the product of his pains in any market that is overstocked with inferior peaches, and even high grade peaches, in inferior packages.

When all resources fail to bring good prices for the peach crop in the fresh state, it is necessary to find other means for its disposal. Eating when ripe is certainly the most agreeable way of using peaches; probably nine-tenths of all grown are eaten in their uncooked states. But large quantities are also canned, evaporated, distilled and disposed of in other ways. The question of handling to advantage the surplus and by-products of the peach industry is a most important one to all orchardists. There is no necessity for the grower to suffer loss in years of abundance, when there are so many ways in which the surplus fruit, both good and bad, may be saved from the hog pen and the compost. By means of the canning factory, the evaporating plant, and the distillery, we can utilize fruit that would otherwise be a loss to the grower. Other means, as noted in the following pages, may also be resorted to. In all these cases, numerous and various methods are practised. It is not our purpose to discuss them all in minute detail, nor to intimate that the systems noted in the following paragraphs are the ones *par excellence*. What we do present for the reader's consideration is the result of our observations, limited though they may be.

Commercial Canning. This is a business by itself and one that requires expert management to be a success. The average fruit-grower who intended to go in for canning as a business would have to employ an experienced canner, as it would not be possible for him to attend to the orchard, the gathering of the fruit, and the management of the cannery at the same time. To be successful, a cannery must be run for as long a season as possible and with economy, so as to do the largest amount of work for the capi-

tal invested; and nothing but standard or high-grade fruit should be put up, so that a name and reputation for reliability and excellence of the output can be established. Unless the orchard be of large size and planted with selected varieties, ripening in succession, and especially adapted for canning, it would not be possible for the individual grower to keep up a constant supply of suitable fruit for the cannery from any one orchard. For these reasons it is obvious that the average fruit grower, without experience, would in all probability fail to make a success of the canning business. A more practical idea would be the establishment of co-operative canneries in the centres of our principal fruit growing districts.

One of the simpler processes of canning peaches that I noted in the south may be briefly described as follows: The fruit, on arrival at the cannery, is first halved, pits removed and peeled. This is done by women who are paid so much per bushel for the work, usually about twenty cents. About 75 good peelers are required to turn out 10,000 cans of first-grade fruit per day. For low grade fruit, such as "peeled pie"—which is only another name for fruit-pulp—more peelers are necessary. In both cases foremen should instruct and watch the peeling.

From the peelers the peaches are carried by boys to the packing or filling tables. Here they are placed in cans, the size of which depends upon the grade of fruit being put up. Standards, or first grades, are packed full and tightly into the cans; second grade and peeled pie are placed into the cans only two-thirds full. About twenty or twenty-five packers are required to handle the peaches for the above mentioned daily output.

To aid in its preservation, the higher grades are sweetened, either with sugar or syrup. The latter is made by dissolving the best crystalline cane sugar in boiling water, and is added when cold till the can is completely filled with fruit and syrup. A more common method, however, is to place the sugar directly into the cans, and before the peaches are put in. Enough sugar for each can is added to make what is termed a twenty degree syrup. The strength of the syrup varies, however, according to the quality of the fruit being put up.

After the sugar and fruit is added, the cans are "trayed off" (i.e., placed on wooden trays containing a definite number of cans each), taken to the water tank and filled with water.

The trays are now placed in an "exhaust" box and steamed; standards, jacket pie (unpeeled peaches) and peeled pie for five minutes, second grade for three minutes. This is done to have the peaches thoroughly heated before covers are put on, in order to insure a better state of preservation. The time for steaming can only be known by practice, the above mentioned time being only approximate.

From the exhaust box the fruit is taken and placed on a wiping table, where a girl wipes off the tops of the cans with a brush. To keep tally of the work done by the "cappers," who are to follow, the girl places a check or ticket on each tray.

The cappers then take the cans, pocket the checks, and "cap" the cans; i.e., solder on the lids. A vent-hole in centre of cover, to allow air to escape when capping, is also tipped with solder. The cappers should mark the cans (each man having a distinct mark) to trace the origin of possible leaks. Three men can cap and tip 10,000 cans in ten hours. They are paid by the piece, usually about $1.50 per 1,000.

After capping, the cans are placed in iron cages and "processed;" i.e., submerged in boiling water and cooked till the fruit has reached the proper

degree. In the cooking of the fruit expert knowledge is absolutely necessary, as no hard-and-fast rules can be laid down. It is simply a question of practical experience, and depends entirely upon the variety and grade of fruit, its ripeness, texture and cooking qualities. The time required for peaches to be properly cooked and to acquire their full flavor may vary from five to twenty minutes. The following, however, may serve as an estimate:

Standards	9	minutes.
Jacket Pie	12	"
Seconds	8	"
Peeled Pie	12	"

As soon as processed, the cans are removed to a vat of cold water, where they are cooled. They are then stored for a week or ten days, so as to show up any leaks that may occur. These are thrown out and the good cans prepared for sale.

The remainder of the work is merely finishing, and consists in coating the ends of the cans with blue or bronze, to improve their appearance; labelling, for which purpose a good show lithograph should be used; and the final packing in cases, also labelled, for the market.

Peach Pulp. Under the previous section of this article we referred more or less to the manufacture of peach pulp, or pie fruit, as it is sometimes called; but, as there has been a considerable interest among fruit growers regarding the matter, and as literature on the subject is scarce and difficult to find, a few additional suggestions may be appropriate.

The particular value of fruit pulp is that it is a cheap means of preserving the inferior fruit that is not good enough for canning; and we are enabled, thereby, to keep it until convenient to make it into jam. At home and where the facilities for canning are not available, all surplus peaches that are sound, whether high grade or inferior, may be utilized in this manner. It is only in the commercial canning factory that the manufacture of pulp is reserved for the inferior fruit.

The main difference between ordinary canned fruit and the preparation of peach pulp is that in the latter there is no sugar or syrup used in its preservation. The peaches should be halved, peeled and cut into pieces, the size of which will depend upon the soundness of the fruit. These are placed into cans of some uniform size, water is added to cover it, and it is steamed, as previously mentioned. Where steaming is not practicable, the lid may be put on as soon as the cans are filled, leaving a vent-hole in the centre. The cans may then be placed directly into the boiling water and cooked until the whole of the contents is raised to boiling point, and all the air in the cans has been driven off. The time required to cook pulp will vary from ten to twenty-five minutes, according to the condition of the fruit being put up. The vent-hole is then closed and the cooking is complete. The cans are examined for leaks the same as for ordinary canned fruit.

In some factories, the pulp is cooked in bulk and stored in barrels. At a more convenient season, it is either sold as pulp or manufactured into jam.

Home Canning. The fundamental principle involved in canning, whether at home or in the factory, is that of destroying the germs of fermentation by the application of heat. It is essential that this principle be recognized in order to retain much of the natural flavor and richness of the fruit and to insure its preservation.

Many methods of preserving peaches in the home are practised. One only I shall briefly attempt to outline. After the fruit has been prepared,

as previously described under the head of commercial canning, it is placed in jars before cooking, and covered with syrup. The jars are then put in a large oval boiler or other suitable vessel, having some device to prevent the jars coming in contact with the metal bottom, and being broken during the cooking. Cold water is then added to the vessel till it reaches the neck of the jars. This is slowly heated to the boiling point, at which stage the peaches should be sufficiently cooked. The lids should be put on immediately and the jars sealed air-tight, as the fruit will not keep otherwise.

Drying. Canada to-day is dependent almost entirely upon other countries for her dried fruits. This should not be in a favored country like ours, where nearly all classes and varieties of fruit suitable for drying can be grown successfully. True, our climatic conditions will not allow us to compete favorably with those countries that dry their fruits by means of the sun's rays and in the open air; yet, in mechanical evaporation, we have a means at our disposal by which we may materially increase our home production of this commodity, and relatively decrease our foreign importation.

Peaches are dried by three methods, viz., sun-drying, house-drying, and machine-drying or evaporating. The selection and preparation of the fruit is practically the same in all cases, but the after treatment differs in many respects. A full discussion of these methods would require a series of articles; so, in order to keep this section of our article within reasonable space, I shall condense it and treat the subject in a general way rather than attempt a lengthy discussion of details.

Sun-Drying. This process is not practicable in Canada, although in some of the peach sections, with proper care and attention at night, it might be practiced to supplement the work of the evaporator. In reality, it can only be depended upon in countries that have long seasons of warm weather, and where the air is dry and the nights dewless.

House-Drying. Every peach grower whose means and limited acreage do not warrant the necessary cost of a mechanical evaporating plant, should have one or more simply constructed drying houses. These may be built by any ordinary carpenter in a few days. All that is required is a room, ceiled closely, with rests for fruit racks, having slatted bottoms, arranged all around the walls. A good large stove in the centre of the room, keeping the temperature up to 150 degrees, will dry the peaches in about two days.

Evaporation. Probably the most economical and profitable process known for the preservation of peaches is that of evaporation. Peaches dried in a well managed, up-to-date evaporating plant are said to be more nutritious and digestible, to keep better and longer, and to command a better price in the market than those preserved by the sun and the older methods of drying. In order to retain the natural richness and flavor of the fruit, and to insure its preservation, it is necessary to keep the temperature in the evaporator as high as possible without injury to the fruit, and to keep a continuous, rapid circulation of air throughout the compartment.

The peaches should be cut evenly in halves, and the pits removed. If the market price and demand for peeled peaches over unpeeled is sufficiently more to pay the grower for the extra trouble and expense of peeling, they should be peeled. As a rule, most of the dried peaches found on the market are unpeeled. Place evenly on trays or screens with the cut side up.

Whether or not the trays should be submitted to the fumes of sulphur is a matter of taste and opinion. Sulphuring is a bleaching process, and greatly improves the color, especially of old, off-colored fruit. The time allowed should only be long enough to fix the color, as any exposure beyond this will injure the quality of the fruit. To bring about this condition some

growers use a small quantity of sulphur, and expose the peaches for two hours or more, others use a comparatively large amount, and expose relatively only a short time. The exposure differs with the variety, and with the same variety in different conditions, and must be learned by experience When properly fumingated, the peaches are placed in the evaporator. To secure the best flavor, see that the green fruit is always nearest to the heat, and that the dried fruit comes out at the top. The temperature for drying and the length of time required differs with the different styles of evaporators. In some styles the temperature is kept as high as 200 degrees F. for eighteen to twenty-four hours; in others, more or less as the case may be. The important point to observe in this respect is not the amount of heat, but uniformity. The time required for the peaches to dry properly can only be determined by observation and experience, and the degree of heat.

The fruit should be removed from the evaporator while quite pliable, and not allowed to over-dry. It is then placed in bins or on the floor of the fruit house, turned over occasionally, and allowed to remain until it has passed through the sweating process. It is then graded into various sizes and conditions of color, and packed into clean, uniform packages. The best grades are "faced" in the boxes. Some fair specimens of the fruit to be packed are flattened by running through a wringer or specially constructed pair of rollers. The flattened fruit is placed in the box, cut side down. The box then is filled to the top, the bottom is nailed on, the package inverted and the bottom becomes the top.

The proportion of evaporated from fresh peaches varies with the variety, from five to eight pounds to the bushel is a fair estimate. Peaches should be quite ripe to dry nicely. Early varieties are not satisfactory, as they are too watery, and not well enough matured near the pit.

Evaporators. There are many styles of evaporators on the market, from the small family affair, to be set on the back of a cook stove and capable of drying about three bushels of fruit per diem, to the giant factory driers, capable of turning out several hundred bushels daily. Among the latter are horizontal evaporators, towers or stacks, steam tray evaporators, air-blast evaporators, and various others. Before purchasing, a careful investigation should be made, with a view of finding the one of the desired capacity that will produce the best results at the least cost.

Two methods are involved in the process of evaporation; one by the rapid circulation of heated air, and the other by steam pipes laid in horizontal tiers and passing back and forth through the chamber of the evaporator. This latter method is probably the most efficient and economical for very large establishments. The heat is more uniform, more evenly distributed, and more completely within the control of the operator than when hot air is used, and there is less danger of scorching the fruit. The use of hot air, however, is most generally adopted. The apparatus required is less expensive, and with a little care and experience to keep up an even temperature of sufficient heat with perfect circulation, just as good an article may be turned out.

In all hot air evaporators, the heat is supplied by a furnace, below the trays. This furnace is filled with draughts so that the temperature may be controlled. Fresh air is drawn in through specially-arranged inlets, heated, and passed either over or through the fruit on the trays.

In the best forms of commercial evaporators, the fresh fruit is put in at the bottom (i.e., nearest to the heat), and the dried fruit comes out at the top. By means of a mechanical contrivance worked by a crank, the whole stack of trays is raised one notch or space to admit each fresh tray at the

bottom. The fruit is dry when it reaches the top of the stack. The trays are than removed, emptied, refilled with fresh fruit and used again. Thus the system is continuous, and during the busy season such a machine may be worked day and night.

Good machines for use either on a large or small scale can be obtained in Canada. Additional apparatus, bleachers, slicers, parers, etc., also are necessary to the complete equipment of an up-to-date establishment.

Peach Jam. Jams are most commonly made from plums and small fruits. A good jam may also be made of peaches when other means for disposing of the surplus are not available. Small and bruised peaches, if used when fresh, may be utilized in this manner—though first-class jam should be made from first-class fruit. The process of jam making noted by the writer is a simple one. The fruit is placed in a steam-jacketed kettle and one-half or three-quarters of a pound of sugar is added for every one pound of fruit. It is then boiled until of the required consistency, poured into cans or jars and sealed down air-tight at once. The English market demands glass jars. When for home use, the jam may be made in any iron or copper kettle, lined with enamel, over a slow fire. If such is used, it is necessary to stir constantly to prevent scorching, and the impurities that rise to the surface should be removed.

Peach Butter. This by-product of the peach orchard is made and put up in much the same manner as recommended for jam, differing only in being spiced and in the quantity of sugar used. Large quantities of peach butter are used in England like jam, as a substitute for common butter.

Peach Jelly. This is one of the most attractive forms in which peaches are placed upon the market. It is sold at a large profit to the producer, as pure jellies are scarce and high-priced. It is made from pure peach juice and sugar in various proportions, personal and market preferences determining the ratio. Some manufacturers use sugar enough to produce a twenty-degree reading on the saccharometer, others use as high as equal proportions of sugar and juice. Peaches for jelly should be sound and fully ripe. The pits should be removed and the fruit crushed in a press. The juice is then filtered, the sugar is added and it is boiled incessantly for about eight minutes, when it should reach the right consistency: *i.e.*, will keep its shape up-ended when cold. The jelly is then put up for market in much the same way as recommended for jam.

Crystallized Peaches. The production of candied or crystallized fruits is carried on most extensively in California and France. Even in those countries the product is not large, as the process is not a definite one, being more or less in an experimental stage. Wickson's "California Fruits" states that "The theory is to extract the juice from the fruit, and replace it with sugar syrup, which, upon hardening, preserves the fruit from decay, and at the same time retains the natural shape of the fruit. Though the method is very simple there is a certain skill required that is acquired only by practice."

Brandied Peaches. In the preparation of brandied peaches, only sound, full-grown, and not quite ripe fruit should be used. Each specimen is wiped clean, and pricked to the centre with a silver or wooden instrument. The fruit is then placed in water heated almost to boiling point, removed from the fire and allowed to stand ten minutes. After heating again, it is thrown into ice-cold water. When cold and drained it is put into a tub of brandy (55 per cent. alcohol) and allowed to stand for six days. Next the fruit is placed in jars. To each gallon of brandy, in which the fruit has been soaked, add four ounces of sugar and heat to 200 degrees F. Fill the

jars containing the peaches with the hot sweetened brandy, and seal air-tight. Store in a dark, cool place. Spice, essence of cinnamon or cloves, may be added to the brandy, before the fruit is put in. This process is recommended by the North Carolina State Board of Agriculture.

Unfermented Peach Juice. Peach juice makes a delicious and nourishing summer drink. It is used in the preparation of syrup for soda fountains and it has a wholesome value in cookery. The demand for fruit juices is increasing and is such as to warrant a greater effort on the part of the manufacturer to supply a pure and attractive article. In making peach juice, the fruit is crushed, pressed, and filtered. The juice is then clarified by adding the white of two eggs for each gallon of juice. Then heat nearly to boiling point. After allowing to stand for two hours, siphon off into bottles. Place these in cold water, heat to boiling and seal air-tight. Allow bottles to cool gradually and store in cool, dark, dry cellar.

Peach Wine. From time immemorial, sparkling wines have played a prominent part in the celebration of all momentous events and happy occasions. Sparkling wines are made from the juice of black grapes; ordinary wines may be made from the juices of various fruits, including peaches, and even tomatoes. Sparkling wine differs from ordinary wine in that it contains a considerable quantity of carbonic acid gas, which has been retained in the wine by bottling it before the completion of the alcoholic fermentation.

Good sparkling wine is difficult to make. Perfect quality, which depends upon the selection of the raw material and the perfection of the process, is secured only by delicate skill, precision, and long experience. Ordinary wine, sweet or dry, is simple enough to make and may be prepared in the orchard of any peach grower. Quicker and probably more profitable returns may be secured, however, by utilizing the surplus peaches in the cannery or evaporator.

Peach Brandy: Sixty years ago, peaches, in many parts of America, were raised principally for distillation. Every peach growing centre had its distillery and every planter had a large share of his crop turned into brandy. Peaches were cheap then and good brandy could be bought for fifty cents and less per gallon. This was before the days of internal revenue. To-day distilleries are few and far between, and peaches are raised chiefly for consumption in the fresh state, and peach distilleries are few and far between.

The following outline, though not complete, will give a general idea of the process: The peaches which should be fully ripe are placed in barrels and mashed to promote fermentation. When doing this, care should be taken not to break the pits, as such when broken and boiled liberate prussic acid which tends to make the brandy bitter. The barrels are allowed to stand eight to twelve days, seldom longer. The pomace is then put into the still, about two-thirds full, and boiled for about three and one-half hours. Boiling may be quicker, but a slow process brings out the most brandy. When the condensed brandy commences to run, it is filtered through charcoal suspended in a keg by means of a double flannel cloth. The first run may be comparatively weak, around 70 proof; the last, usually very strong, about 150 proof; the average, however, will be about the desired standard, usually 100 proof. The liquor is barrelled as soon as distilled, bunged up tightly, and allowed to stand some months before using. Brandy will vary in body and flavor, strength and delicacy according to the richness of the pomace, the amount of care and experience exercised in its manufacture, and the length of time it stands in the wood.

Vinegar. Vinegar is generally made from apple and grape juice, although an equally fine article may also be made from refuse peaches. The fruit is placed in casks, mashed and thoroughly broken up, allowed to stand for a sufficient length of time, and the liquid is drawn off into clean casks as it accumulates. In these new vessels it is allowed to stand for some time, and, if sediment settles, it should again be drawn off before finally being put away for use.

Miscellaneous. Fallen fruit is unfit for any purpose except as food for hogs or as a fertilizer. Swine turned into the orchard to forage upon fallen peaches not only increase in value themselves, but they also destroy infesting insect larvae and fungous diseases and they add fertility to the soil through their excrement. The particular value of peaches as a fertilizer is not known to the writer. In some peach sections it is a common practice to return the culls and refuse to the soil. Fallen peaches may also be gathered and dried for their seeds.

Peach pits may be utilized by planting in the home nursery or by selling to professional nurserymen who usually pay a good price for selected seed. It is well to observe that pits from the distillery or cannery, where they have been boiled, are unfit for nursery practice. In England, an essence of some kind is extracted from the pits and a very appetizing beverage may be made from them as follows: Remove the kernels from the pits and crush them in water, filter, add sugar to suit taste and boil.

Noyau, a by-product of the peach industry, is "a cordial made from brandy sweetened and flavored with orange peel and the kernels of peach stones, bitter almonds and the like." It is also made by steeping the leaves of the peach in spirits. The leaves yield also a milder liquor that is used for flavoring cookery. The blossoms and the buds yield, by a system of distillation, agreeable and fairly pure perfumes.

WINTER SPRAYING.

During the winter of 1901-02, the writer undertook some experiments in the orchards of the Ontario Agricultural College on winter spraying. The work was performed not with the idea of presenting anything new, but to confirm the experiments of Prof. Whitten in Missouri and of Prof. Macoun and others in Canada, and to determine whether or not the advantages in retarding bud growth and aiding tender fruit trees to escape the stimulating effects of warm spells in winter and subsequent injury from freezing, claimed for winter spraying with whitewash, were to be had at Guelph. Should such results be secured, and they have been, a second purpose of our work was to emphasize still further these advantages, and also to draw the attention of Ontario fruit growers more closely to the fact that, in winter whitewashing they have a means at their disposal by which peach trees in peach sections may be grown with less risk than in the past, and a means by which the present peach growing area may be enlarged.

Originally we intended to conduct rather extensive experiments along different lines in this connection, and we may do so yet. Pressure of time and other duties, however, did not allow us to carry out these good intentions. Unfavorable weather conditions stepped in also and spoiled the possibility of definite results in more than one phase of our work. For these

reasons we have decided to confine our remarks to a brief statement of the work done and the results obtained in two lines of the work only; viz.:

1. Retarding bud growth in spring, and
2. The effect of whitewash on the oyster-shell bark-louse.

Retarding Bud Growth in Spring: During warm days in February and early spring, peach buds are apt to start into growth and, in the event of subsequent freezing, they are more than likely to be winter-killed. The

Fig. 15. Hill's Chili peach twigs, unsprayed and sprayed.

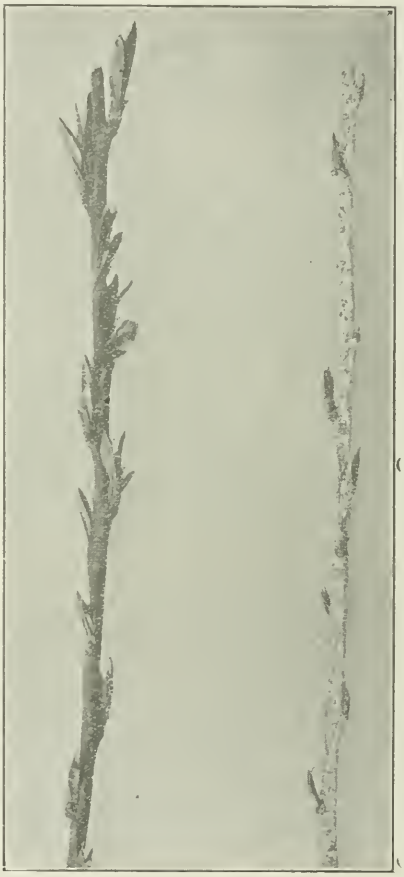


Fig. 16. Bernard's Early peach twigs, unsprayed and sprayed.

best means known to prevent this premature swelling of the buds is whitewashing the trees. Whitewash reflects rather than absorbs the heat, and, as a consequence, it holds the buds back and allows them to escape injury from winter-killing. The whitewash should be applied early in winter, giving two coats, and repeated often enough to keep the trees white. The mixture used in our experiments was prepared in the following proportions:

Lime	2 lbs.
Water	1 gal.
Skim milk	1 qt.
Salt	5 ozs.

The lime was slaked in a small amount of warm water and stirred so that it would slake well. The remaining ingredients and water were added and the whole was mixed by stirring thoroughly. After straining through a one-twelfth inch sieve the mixture was applied immediately to the trees. The trees selected for this experiment were apples, pears, and peaches. The following table gives the dates of spraying, dates of bud swelling and results.

Apple Trees.	Date of 1st spraying.	Date of 2nd spraying.	Date of 3rd spraying.	Date of bud swelling.	Results.
St. Lawrence, sprayed	Jan. 2	Feb. 10	March 15	April 19	Buds retarded
" unsprayed				" 16	three days.
Gravenstein, sprayed	Jan. 2	Feb. 10	March 15	" 15	Buds retarded
" unsprayed				" 10	five days.
Pear Trees.					
Flemish Beauty, sprayed	Jan. 4	Feb. 10	March 15	April 28	Buds retarded
" unsprayed				" 19	nine days.
Bessemianka, sprayed	Jan. 4	Feb. 10	March 15	" 26	Buds retarded
" unsprayed				" 19	seven days.
Peach Trees.					
Hill's Chili, sprayed	Jan. 2	Feb. 10	March 15	April 22	Buds retarded
" unsprayed				" 11	eleven days.
Barnard's Early, sprayed	Jan. 2	Feb. 10	March 15	" 19	Buds retarded
" unsprayed				" 14	five days.

The results of these tests show that whitewashing has a most decided effect upon the relative dates of bud growth on sprayed and unsprayed trees. In two particular cases, Flemish Beauty pear and Hill's Chili peach, the effect is most marked, and may have been influenced partly by other causes and conditions. To more fully appreciate these effects, we have only to glance at the accompanying cuts (Figs. 15, 16, 17, and 18) of twigs from the different trees under experiment. All of them were taken on the same day and are twigs of the previous season's growth.

The Effect of Whitewash on the Oyster-shell Bark-louse. In a series of experiments at Ottawa, Macoun found that whitewashing is a promising means of eradicating the oyster-shell bark-louse. The effect of the lime was to loosen the scales and expose the underlying eggs to the action of the weather, and ultimately bring about the removal of the scales from the trees by rain and wind. In the course of the experiments, it was also found that the lime, in itself, did not injure or kill the eggs within the scales, nor was there any noticeable injurious effects from its use on the trees sprayed.

To corroborate these results, in a small way, we sprayed at Guelph two infested Wealthy apple trees with a mixture of lime and water in the following proportion:

Lime ..... 2 lbs.
Water ..... 1 gal.

The condition of the trees, before and after spraying, and other information is given in the following table. The results obtained are by no

FIG. 17. Gravenstein apple twigs, unsprayed and sprayed.

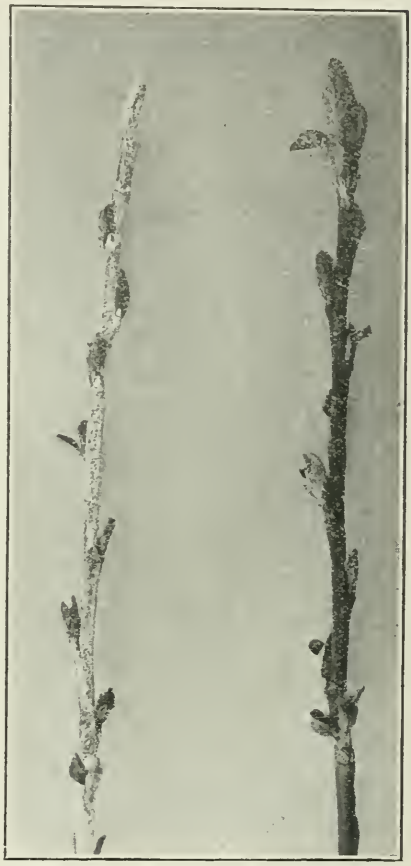


FIG. 18. St. Lawrence apple twigs, sprayed and unsprayed.

means conclusive, as the experiment was limited in its scope, was subject possibly to unfavorable conditions, and was performed but once.

WHITEWASHING TREES INFESTED WITH OYSTER-SHELL BARK-LOUSE.

Before spraying.	1st spraying.	2nd spraying.	Condition April 15, following.	Condition Sept. 15, following.	Remarks.
	1901.	1902.			
No. 1. Infested considerably; not badly.	Dec. 31..	Feb. 10..	Infested considerably; no apparent change.	Still considerably infested; a slight decrease in number of scales.	Results poor.
No. 2. Infested badly.	Dec. 31..	Feb. 10..	Still infested considerably, but remaining scales easily removed by slight stroke of hand on limb.	Still slightly infested, but most of the scales had been removed during summer.	Results convincing

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Thirteenth Annual Report

OF THE

Fruit Experiment Stations

of Ontario

UNDER THE JOINT CONTROL OF

THE ONTARIO AGRICULTURE COLLEGE, GUELPH

AND

THE FRUIT GROWERS' ASSOCIATION OF ONTARIO

1906

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TORONTO

To the Honorable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honor:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Fruit Experiment Stations for 1906.

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1907.

FRUIT EXPERIMENT STATIONS.

BOARD OF CONTROL, 1907.

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P. W. Hodgetts ..... Secretary O. F. G. A.

THE ONTARIO FRUIT EXPERIMENT STATIONS, 1907.

	Name.	*Specialty.*	*Experimenter.*
1.	Southwestern	Peaches	J. L. Hilborn, Leamington.
2.	Essex	Vegetables	E. E. Adams, Leamington.
3.	Wentworth	Grapes	Murray Pettit, Winona.
4.	Burlington	Blackberries and Currants	A. W. Peart, Burlington.
5.	Lake Huron	Raspberries, Gooseberries and Plums	A. E. Sherrington, Walkerton.
6.	Georgian Bay	Plums	J. G. Mitchell, Clarksburg.
7.	Simcoe	Hardy Apples and Hardy Cherries	G. C. Caston, Craighurst.
8.	Bay of Quinte	Apples	W. H. Dempsey, Trenton.
9.	St. Lawrence	Hardy Plums and Hardy Pears	Harold Jones, Maitland.
10.	Algoma	Hardy Fruits	Chas. Young, Algoma.
11.	Maplehurst	General Collection of Cherries, Peaches, Grapes and Pears for comparative study	The Secretary.

CO-OPERATIVE WORK.

Strawberries ..... Rev. E. B. Stevenson, Guelph.
Vegetables and Strawberries ..... Prof. H. L. Hutt, O. A. C., Guelph.
Hardy Fruits ..... W. T. Macoun, C. E. F., Ottawa.
" ..... C. Chapman, Judge, Ont.
" ..... B. Bisbe, New Liskeard, Ont.

Fruit Experiment Stations, 1906.

THE SECRETARY'S REPORT.

By Linus Woolverton, Grimsby.

Owing to the uncertainty on the part of the Board with regard to the extent which the Experimental Fruit Farm at Jordan Harbor will take over the work of our present stations, very few new varieties of fruit were sent out to our fruit stations in the spring of 1906.

It is, however, recommended that several of them be continued, so as to work in co-operation with the new station at Jordan Harbor, and test the adaptabilities of varieties to the various districts of the Province. Much valuable information for farmers in Algoma is being obtained at the Algoma stations, and the Board has instructed me to send liberal supplies of promising varieties to Mr. Chas. Young for future experimentation.

Two farmers who have recently settled in New Ontario have applied for collections of varieties for testing there, to see if some fruits will succeed; and the Board has instructed me to furnish them varieties for co-operation. Already we have sent to Mr. C. Chapman, Judge, Ont., the following list which he reported alive in the fall of 1906.

Apples: Transparent, Astrachan, Duchess, McIntosh, Charlamoff, Wealthy, Gideon, Transcendent, Hibernal, Hyslop, Whitney, Martha.

Plums: Burbank, Chabot, Red June, Hawkeye, Stoddart, Wolf; also some small fruits. A larger and better assortment will be tried next spring.

Among experiments to be conducted at the Jordan Experimental Fruit Farm the Board recommend the propagation of peaches on different stocks, especially upon the St. Julian and the American plum stocks, and have them tested at our various stations to see if peaches so propagated will not withstand the cold in sections such as in Essex, where they are subject to root killing; and also enable fruit growers who have clay soil to grow peaches.

A vegetable experiment station has been opened at Leamington, and the Board has appointed Mr. E. E. Adams, of Leamington, to take up this work. The secretary has been authorised to procure seeds for this work, and to outline the following lines of work for 1907, viz.:—(1) Testing all varieties of early tomatoes; (2) Methods of pruning and training late tomatoes; (3) Varieties of sweet potatoes for profit; (4) Notes on forcing crops; (5) Comparison between sprouted and the sprouted potatoes for planting.

The financial report of the year, as submitted to the Board by the Secretary was as follows:

Financial Statement for 1906.

Salaries of Experimenters	$1,975 00
Fruit Exhibits, Industrial, $ 79 11) Massey Hall, 157 42)	236 53
Travelling Expenses of Inspectors	154 43
Photographs	12 00
Salary of Secretary	300 00
Salary of Inspector	100 00
Board Meetings	54 37
Committees	27 65
Postage	10 00
Stock for Stations	37 80
Express charges	9 85
	$2,917 63

The Dominion Conference.

Acting under instructions from our own executive, and with the permission of the Hon. Minister of Agriculture, I attended the second conference of Fruit Growers of the Dominion of Canada, held at Ottawa, March 20, 21 and 22, 1906.

In comparing notes we found very few present who were in attendance at the First Conference at Ottawa, at which I was also present as a delegate from the Ontario Fruit Growers' Association.

On the afternoon of the second day, His Excellency the Governor-General being present, I was called upon by the Hon. Sydney Fisher to give an address on Fruit Experimental work in the Province of Ontario, and was followed by Prof. F. C. Sears for Nova Scotia; A. T. Peters for New Brunswick; A. G. Glendennan for Alberta; and Martin Burrill for British Columbia.

I gave a summary of our work in the past, and suggested that a Dominion official might collect data on fruits tested in the various provinces for the general good, and might aid in securing a common nomenclature for all fruits grown in the Dominion. Among other things I suggested the advisability of some method of guarding the rights of originators of valuable new fruits, and possibly providing some method of public recognition of valuable services in this direction.

Prof. H. L. Hutt, of our Board, was also present, and gave an account of the co-operative work in fruit accomplished by the Ontario Agricultural College.

The Horticultural Exhibition.

At the request of your secretary, the experimenters sent in collections of fruit from their stations to Massey Hall. These arrived on Monday the 5th of November, when your Secretary was in attendance, and secured space for each station. One long table, the length of the basement, was secured for our fruit station exhibit, and was filled from end to end.

I had four signs placed conspicously upon the table, showing the character of the exhibits, and I was in attendance to answer questions the whole week.

Our bulletin on fruits recommended for planting in Ontario was freely distributed during the fair. I secured several hundred copies from the Department, and gave them to persons who made inquiries regarding varieties for planting.

Vegetable Exhibit.

In response to my request, Mr. E. E. Adams of Leamington, our newly appointed experimenter in Vegetables, was in attendance, and showed a fine collection of vegetables for a first exhibit, which attracted much attention. Mr. Adams was present most of the week to answer questions. The complete list of his exhibit was as follows:

Corn: Stowell's Evergreen (sweet).

Corn: Early Ohio, Smut Nose, White, Yellow and Red Gourd Seed, Little Bailey, Leaming, Yellow Flint, all for field purposes.

Corn: Queen's Golden and Rice for Popping.

Celery: White Plume, Perfection Heartwell, Pearle le Grande, Winter Queen, Triumph.

Cabbage: Late Drumhead.

Carrot: Improved Short White, White Intermediate.

Carrot: Chantenay, Danvers, Ox Heart.

Citron: Green for preserving.

Onion: Giant Rocca, Mammoth Silverskin, Large Red Wethersfield, Prizetaker, Giant of Gibraltar, Yellow Dutch Setts.

Parsnip: Hollow Crown.

Peppers: Long Cardinal, Procopp's Giant, Chinese Giant, Neapolitan, Cayenne.

Squash: Red and Green Hubbard, Large Field.

Potato: Gold Coin, Sensation, Rose of the North, Early Rose, Empire State, Beauty of Hebron, American Wonder.

Potato: Yellow Nansemond (sweet).

Water Melon: Halbert Honey.

Pumpkin: Cashaw, New Winter Luxury, Small Sugar.

Apples Shown by Simcoe Station.

Of the fruit station exhibits Mr. G. C. Caston's attracted great attention, especially on account of his large pyramid of immense Wolf River apples, from his station in Simcoe County. One lady offered me $1.00 for a single specimen, to send to Copenhagen, to show what apples we can produce in Ontario. I secured one for her without charge, after the fair closed.

Mr. Caston's Peerless apples were next in importance. This variety has been every year growing in favor with Mr. Caston; until now he speaks of it with considerable confidence as a desirable fall apple for export. It is productive, clean, uniform and beautiful; a seedling of the Duchess. His Gano, too, were especially good. Mr. Caston also rendered valuable assistance in attending at the table during the exhibition. His complete list was as follows:—

Boiken, Hulburt, Gano, Hastings, Blue Pearmain, Canada Red, Steele's Red Winter, Peerless, Baxter, Ribston, Cooper, Bottle Greening, York Imperial, Ontario, Salome, Grimes, N. W. Greening, Large Anis, Spy, Shiawassee, Pipka, Aport, Shackleford, Winter Maiden's Blush, McIntosh, Greening, Ribston, Alexander, Golden Russet, Wolf River, Blenheim, Baldwin, Stark, Fallawater, Tolman, Fameuse, Ben Davis.

The Burlington Station Exhibit.

Mr. Peart showed a large collection of apples, many of them southern varieties of which the Board had sent him scions for testing on old trees. Most of these Mr. Peart reports as of little value for Ontario. He also showed a magnificient collection of currants, raspberries, blackberries and cherries in glass bottles, which attracted considerable notice. Another season, I would advise that shelves be put up for these in such a manner as to bring them near to the eye of the visitor.

At my request the varieties recommended for the Burlington district were shown in large pyramids. The following is a list of varities shown:

Apples: Nickajack, Minnesota, Malinda, Houseley's Winesap, Ozark, Highfile, W. C. Limberton, Gill's Red Winter, Bonum, S. Pearmain, Huntsman, Rebel, Gilbert, Wandering Spy, Kentucky Tolenstein, Spy, Baldwin, Greening, King, Seek, Holland Pippin, Esopus Spitzenberg, Blenheim, Golden Russet, Sox Russet, Snow, Swaar.

Pears: Kieffer, Anjou, Clairgeau, Idaho, Louise, Lawrence, Sheldon.

Bottled Fruits.

Blackberries: Agawam, Ancient Briton, Eldorado, Erie, Kittatinny, Snyder, Stone's Hardy, Taylor, Western Triumph.

Cherries: English Morello, Montmorency, Windsor.

Mulberry: Russian.

Currants: Baldwin, Belle de St. Giles, Black Victoria, Boskop's Giant, Brayley, Champion, Cherry, Collins' Prolific, Crandall, Fay, Lee, Naple-, New Victoria, North Star, Pomona, Prince Albert, Raby Castle, Red Cross, Red Dutch, Red Victoria, Saunders, Versailles, White Grape, White Imperial, Wilder.

Also 1 sample of choke-cherry.

The St. Lawrence Fruit Station Exhibit.

Mr. Jones set up a valuable exhibit from his station. He has proved that a very long list of varieties of apples, pears, plums, cherries, and even some small fruits, sent him by our Board for testing, are not adapted for the St. Lawrence valley. A few varieties however succeed to perfection and these he showed in large pyramids, viz: Scarlet Pippin, Wealthy, McIntosh, Fameuse, and Milwaukee. This last variety Mr. Jones has had under favorable notice for some years as a promising commercial cooking apple, and every year becomes more confident that it is a desirable variety for his district. His complete list was as follows:—

Pyramids: Fameuse, Scarlet Pippin, Baxter, Milwaukee, Tolman, Canada Red, Wealthy.

Plates: Mann, Ben Davis, Golden Russet, Gano, Pewaukee, Pomme Grise, Yellow Bellflower, Downing's W. M. Blush, Blunt, Interacre, N. W. Greening, Aiken's Red, Parling Beauty, Romanstem, Canada Baldwin, Winter St. Lawrence, Clayton, Milding.

The Algoma Station Exhibit.

Owing to the distance Mr. Charles Young could not come to assist in the setting up of his exhibit, but he sent on to us a box containing a good collection of varieties which had succeeded at his station on St. Joseph Island, where most of the commercial varieties of Southern Ontario are a failure. His list of varieties was as follows:

Pewaukee, Longfield, Winter Arabka, Golden Russet, Colvert, Wolf River, Scott's Winter, Borsdorf, Issam, Sour Seedling, Sweet Seedling, North Star, Gideon, Alexander, Wealthy, Ben Davis, and crabs Martha and Hyslop.

Bay of Quinte Station.

Mr. W. H. Dempsey showed twenty-five varieties recommended for his district, out of perhaps one hundred and fifty, a large number of which he has proved unprofitable. Prominent in his pyramids were Stark, Fallawater, Ontario and Seek; varieties that have done wonderfully well in his orchards.

EXHIBIT OF FRUIT EXPERIMENT STATIONS AT INDUSTRIAL EXHIBITION, 1906.

By P. W. Hodgetts, Secretary Fruit Growers' Association.

In accordance with the order of the Board of Control, an exhibit was made at the Industrial Exhibition, not only of fruit as in past years, but also of the various tools used in the industry, samples of the chemicals used in spraying, together with mixtures already made up, devices for protecting trees from sun scald, rabbits, etc., and literature in connection with fruit growing.

The exhibit of fruit was made along the lines of the report of the stations as given in the bulletin on "Fruits recommended for planting in Ontario." While it was not possible to get all of the fruits, still, as far as possible, the recommended varieties were shown on the tables. For instance, in the varieties which are given as the most valuable ones for market as approved by the Board of Control, were shown, Astrachan, Duchess, Gravenstein, Wealthy, Alexander, McIntosh, Fameuse, Blenheim, King, Hubbardston, Greening, Baldwin, Spy, Ontario, Stark.

The same method was adopted in regard to the varieties specially adapted for home use, and also those for hardy districts. There was some trouble, however, in procuring samples of the latter varieties. The same method was followed out with the grapes, peaches, pears and plums. Placards were printed and placed along with the exhibits, giving the varieties and the purpose for which they were intended.

In reference to the fruits which were not in season, such as cherries, currants, raspberries, gooseberries and strawberries, a collection put up in glass by Mr. A. E. Sherrington of Walkerton was made use of as far as possible, while cards giving the full lists were placed with the exhibit.

In reference to the exhibit of tools, through the kindness of Rice Lewis & Son, Toronto, there were on the tables samples of the following:—

Distan Pruning Saw, Little Grant Pruning Saw, Ft. Water Pruning Hook, 17 S & J Pruning Saw, Douglas Saw, 50 Barrel Hatchet, Pair No. 2 Buckeye Pruners, Pair 134x10 Garden Shears, Budding Knife, Pruning Knife, Shears.

Samples of the various chemicals were exhibited, such as Paris green, arsenate of lead, copper sulphate, ferro-cyanide of potash, whale oil soap, flowers of sulphur, etc. These were again shown in bottles in liquid form, as mixed ready for putting on the trees. Paper and veneer coverings for the protection of tree trunks from various injuries, especially in the north, were also shown. Various types of nozzles and other important parts of spraying pumps were very kindly loaned by the various companies interested, and attracted considerable attention.

In regard to these exhibits for another year, I would suggest that those experimenters who are testing the fruits which are out of season at the time of the Industrial, be requested to put up samples this year of all the varieties as recommended by the Board, so that these will be available for this year's Exhibition. By the spending of a little additional money this year, I believe that even a better exhibit than that of 1906 can easily be shown. As the horticultural exhibits will be in one of the largest and most prominent buildings on the grounds, an extra effort should be put forth to make a banner exhibit during 1907.

In addition to the above, copies of the various reports of the Board of Control, the bulletin on "Varieties," Professor Hutt's bulletin on "Apple Culture," and the other fruit bulletins issued by the Department of Agriculture were displayed on the tables and freely distributed to those interested.

REPORT OF THE INSPECTOR OF FRUIT EXPERIMENT STATIONS.

Prof. H. L. Hutt, O.A.C., Guelph.

The past year has been one of progress and change in connection with the work of the Ontario Fruit Experiment Stations.

Since making my last report, much has been done which will more or less directly affect the continuance of the work at a number of the stations:

(1) The Government has accepted the property at Jordan Harbor so generously donated by Mr. M. F. Rittenhouse, and has now in hand the work of establishing a large fruit experiment station in the Central Niagara District.

(2) At our last meeting a recommendation was made to the Minister of Agriculture, and was, I believe, approved by him, that the stations eventually be reduced in number, retaining those at Trenton, Craighurst, Leamington, and the new one at Jordan Harbor; and that most of the other stations be given from one to two years to complete reports on the varieties now under test.

(3) A Fruit Experiment Station bulletin has been issued giving lists of varieties of fruits of various kinds recommended for planting in different sections of the Province. This bulletin contains in a condensed form the results to date of the variety testing done at the stations during the past ten years.

From this it might appear that the Stations, having accomplished the purpose for which they were established, had now practically completed their work. It must not be forgotten, however, that new varieties of fruits are constantly being introduced, and if we are to keep abreast of the times, the work of testing must be continued and these new varieties will have to be tested and reported upon as soon as possible. As an instance of this we need only refer to the recent introduction of the Spencer Seedless Apple. Here is a new variety of doubtful merit, as yet untried in Canada, being advertised over the length and breadth of the land and sold to Ontario growers at ten times the price of our best standard varieties. If we had no experiment stations for testing such novelties, there might be some excuse for growers generally spending their time and money on such things, but with reliable experimenters in various parts of the country, the general public can save much by looking to the experiment stations to do this testing.

In making my inspection of the stations this year, I have tried to keep in mind what has already been accomplished at the various stations, and to

note what may yet be done by them. In a general way the work of variety testing has been continued as in the past, and each experimenter should be able to report more or less fully upon the fruits he has had under test. These reports are of value, if they add some new information regarding the new varieties which may have fruited, or whether they merely confirm the results given in previous reports.

The weather conditions during the past season have been somewhat unusual, in many parts of the Province. Last winter was exceptionally mild, and fruit trees, as a rule, came through in good condition, although small fruits in the northern parts of the Province, where they usually have the protection of deep snows, suffered more or less from severe freezing when the ground was bare of snow. Last summer severe droughts prevailed in many sections, particularly in the northern and eastern parts of the Province, and for this reason the fruit crop in these sections was far below the average. In some localities as, for instance, in the neighborhood of Guelph, there was an abundance of rain throughout the season, and both early and late crops were excellent. These varied weather conditions will more or less affect the reports of experiments from the different parts of the Province.

Our strawberry experimenter, E. B. Stevenson, of Ponsonby, benefited by the favorable season in the neighborhood of Guelph, and had an exceptionally good crop of strawberries this year. He had over one hundred varieties under test, most of them new varieties not yet introduced to Canadian growers. He has a new plot of one hundred and fifty varieties set out last spring for fruiting next year. In view of the fact that Mr. Stevenson furnishes all his own plants, and that we merely pay him the small sum of fifty dollars for his excellent reports on them, I feel that we can hardly afford to discontinue receiving his reports after another year, as was proposed in the curtailing of the work of the various stations at our last meeting. Mr. Stevenson is doing this work for the love of it, and not for the small sum we pay him for his report, and it rests with us to say if his reports are not worth every year the small sum we pay for them.

In the neighborhood of Walkerton the drought last summer was unusually severe, and crops there suffered to a great extent. At the time of my visit in July to our experimenter, Mr. A. E. Sherrington, the raspberries in his experimental plots were drying on the bushes, consequently, he will not be able this year to furnish a satisfactory report on the varieties under test. It will be remembered that we recommended that two years more be given to complete the work on raspberries and the young orchard at this station. The young orchard in question contains about thirty varieties of apples and thirty-five of pears. The trees have been well taken care of and are just coming into bearing. It is quite evident that it will be impossible for Mr. Sherrington to furnish conclusive reports upon the varieties in this orchard in two years, and if we wish to get such results, we must be content to wait longer for them.

In the report recommending the curtailing of the work of the Stations, no mention was made whatever of the Station of Chas. Young at Richard's Landing, St. Joseph's Island, in Algoma. This station has been doing excellent work for the northern part of Ontario, and Mr. Young has under test a large collection of varieties of different kinds of fruits most likely to succeed in that northern section. The results which he has obtained so far show that with the selection of hardy varieties, fruit growing might be engaged in much more extensively in the northern sections of the Province. I think it is particularly advisable, for the benefit of the northern sections of the Province, that the work at this station should be continued.

The experimental plum orchard of Mr. John Mitchell, Clarksburg, suffered severely during the winter of 1904. The old trees in his original orchard have been nearly all killed. In the young orchard, which contained about fifty varieties, most of the trees still survive, but have been weakened in vitality and bore little or no crop this year, except on the American varieties. It might be well to await results of another year, after which the work at this Station might be discontinued. Mr. Mitchell is now manager of one of the largest co-operative fruit growers' associations in the Province, known as the Georgian Bay Fruit Growers, Limited, and, as his time will now be largely taken up in connection with the co-operative handling of the crop for that section, he will be very glad to be relieved of the experiment station work.

In Eastern Ontario, the drought was probably even more severe than in other parts of the Province, and the apple crop at our St. Lawrence station was the poorest I have seen there during the past ten years. Our experimenter, Mr. Harold Jones, has a young experimental orchard just nicely coming into bearing. He feels that his work will be far from complete at the end of one or two years, at which time it was proposed to close the work at his station. Rather than drop the work in an unfinished state, he has offered to furnish reports, without remuneration, until the varieties in his young orchard have been fully tested, and he has requested that the same be published for the benefit of those in his section.

The new station at Jordan Harbor is expected to take up, in time, the work now being done by the stations at Burlington, Winona, and Grimsby, but, as no planting has yet been done there, it will be several years before we need look for results at the new station. In the meantime, each of the older stations is in a position to furnish valuable information regarding a great many kinds of fruits, for at each of them are large plantations of fruits which have been under test for a number of years.

In concluding this report, I cannot help but refer to the many co-operative associations which have been organized all over the country during the last year or so for the purpose of handling and marketing the fruit crop. This development has largely been the outcome of the co-operative nature of the work of the Fruit Experiment Stations, and many of our experimenters are among the most actively engaged in the new movement. The benefit these organizations are going to be to the fruit industry can hardly yet be estimated, but we are safe in saying that they will many times repay all that has been expended upon the Fruit Experiment Stations.

Reports from the Experimenters.

GENERAL NOTES.

By A. W. Peart, (*Burlington Station*).

Fruit growing this year has not given a large margin of profit. The winter of 1905-6 was a peculiar and extreme one in some respects. During January there were a few days of warm weather followed by several days of zero temperature. This sudden change, I think, accounts for the absence of plums and peaches in this district.

New plantations of fruit have not started very well. The season was hot and dry at the time of planting in the spring, and there are many gaps, especially among the strawberries and young cherry trees.

New wood appears to be going into winter fairly well ripened. The Tent Caterpillar was not troublesome, but there was considerable fall web worm.

The Canker Worm was not plentiful. Codling Moth was very destructive. There was very little fungus, apples and pears being comparatively clean.

Spraying is becoming more general and systematic. It is being realized that squirting a few quarts of water at a tree is of very little use, but that it is necessary to take pains in preparing the mixture, and spraying it finely and evenly throughout the tree. There are several power sprayers in the Burlington district.

Apples were a fair crop of good quality. The Codling Moth reduced materially the amount available for export, but there was very little spot. A few odd apples had "ink" marks. In some narrow belts the hailstorm in summer practically eliminated No. 1 stock. Local markets, evaporators and cider mills, however, handled the surplus without waste.

Pears were a good crop of excellent quality. As a rule they were smooth and clean. The Anjou and Lawrence were especially fine.

Plums were a complete failure, Japan as well as domestic varieties. The fruit-buds were probably destroyed by the sudden climatic changes in the winter.

Peaches were also a failure, probably due to the same conditions.

Cherries were an excellent crop of good quality. Early Richmond, Montmorency, and English Morello were exceptionally fine. Spraying appears to be more effective against the troubles of the cherry than any other fruit.

Grapes were a good crop of desirable quality. Moore's Early and Worden were eminently fine. There was practically no mildew nor black rot, and all varieties ripened.

Blackberries were a fair crop. All varieties bore more or less fruit. Prices ranged from 7 to 12c. per quart, according to quality and season.

Raspberries were an average crop of good quality.

Strawberries were a shorter crop than usual and prices higher.

Currants were a light crop. Prices were from 5 to 7c. a quart for red, and 8 to 10c. for black.

By Harold Jones, (*St. Lawrence Station*).

Character of the Season.—The winter of 1905-6 was in many ways one of the mildest known to the oldest inhabitant. There was very little

snow and that only in December, and some injury was done to trees and in many cases to the fruit buds by the very warm, spring-like weather of February, followed by the extreme cold in March.

Winter actually set in on November 30th, when plowing was stopped, the temperature going down to 5° F. On Dec. 4th, we had the first snow, 1½ inches falling, which gradually increased to five inches, which gave good sleighing up to January 21st, and from that time until spring the ground was practically bare of covering. The coldest night of the season was on February 5th, when the temperature was 21° below zero. The balance of February was springlike and bright, most of the frost coming out of the ground and the buds on the lilacs and other shrubs starting.

During March we experienced a dry cold month, with the frost gradually penetrating the ground to a depth of 22 inches, and very little moisture in the ground.

The result of this steady cold with no snow or moisture had the effect of injuring many fruit buds and killing out all strawberry beds and many flowering shrubs.

Spring opened on April 16th with the ground very dry, and the last frost recorded was on May 10th.

The plum trees suffered severely in bud, but were not killed. Apple trees came into bud very slowly, not opening until about May 13th, more than ten days later than normal. The continued cold weather through May retarded bloom until the last days of the month.

Insect Life.—Insects were not numerous in the spring, but later on in July and August, as the result of very dry, sunny weather and high temperature, all insects multiplied to an alarming extent. The Tussock Moth has been giving some trouble for years, but this year there were no climatic conditions to control the insect and they caused severe damage to the apple crop, biting the young fruit and injuring its quality. The Codling Moth, owing to favorable climatic conditions, continued to multiply in continuous broods from spring to fall, instead of our having two distinct broods, as is usual in this section. As a consequence we may expect to have an unusual number of insects next year, the more so as parasites seemed very much in the minority, and there are egg clusters of nearly all kinds of injurious insects in unusually large numbers. I find that it is necessary to use larger quantities of Paris green with the early sprayings to control the Tussock Moth. They have the habit of eating the terminal growth of the suckers or tender shoots on the inner part of the tree, and also biting the young apple when about the size of a cherry. This deforms the mature fruit, lowering the grade to No. 3 or culls in most cases. For the two sprayings after the blossom falls 8 oz. of Paris green to the barrel of water or Bordeaux can be used with safety and to advantage, provided an excess of lime is used.

Cultivation.—For profitable results the system of cultivation must be maintained, but cultivation continued towards the end of the season has a tendency to produce a late succulent growth which goes into winter in an unripe condition. I have found the best results obtained by giving thorough cultivation from the time the ground can be first worked in the spring until about the last week in June, at which time a thick sowing of red clover—ten pounds or more to the acre—puts the trees in good condition for ripening up the new wood and hardening off the fruit beds. When the cultivation is continued through the season, the terminal growth goes into winter quarters in a green undeveloped condition, holding the leaves during most of the winter, and is often found shrivelled up and dead in the spring.

In fertilizing the orchard, aim to use a manure that is not too rich in nitrogen. When an excess of nitrogen is used you obtain a vigorous succulent growth that is easily injured, whereas if potash is the chief element, the growth is not so rapid, but the fruit bud is better and more fully developed and bursts in the spring full of stored-up energy and vigour.

By A. E. Sherrington, (*Lake Huron Station*).

Owing to the warm, summer-like weather last January, considerable damage was done to fruit trees and bush fruits. In January the weather was so warm that the buds started into growth; then the temperature dropped to twenty below zero, practically killing all of the fruit buds and, in most cases, the leaf buds on the plum and all of the Duke and English cherries. This is the first case of the Japan plums being injured by winter frost. The plum crop here was a total failure. Morello cherries were a good crop, or would have been if the birds had let them alone. The apple crop has been very satisfactory, the fruit clean, medium in size, and all harvested and marketed at good prices, thanks to the co-operative movement. The yield of bush fruits was not equal to last year, being about one-third less; this was owing to winter conditions and the very dry summer.

The co-operative movement has done much towards the improvement of the fruit trade, especially in apples, as more apples and other fruit has been sold at the shipping point than heretofore; a more uniform grade and better pack having been the results of co-operation. This co-operative movement, if conducted along right lines, will in a short time place the fruit industry of this country on an equal with, if not superior to, the Dairy industry.

Insects and Fungi.—Not, in my experience, has the Codling Moth been so destructive as this season. A great loss has been sustained from the ravages of this pest. The past season teaches us that a more systematic cleaning up and spraying of the orchards of Ontario will have to be practiced before this troublesome insect is banished. Less fungi and apple spot was found this season than for many years; nearly all varieties were clean and free from scab.

Fire, or twig blight, was quite prevalent in some orchards; at this station a few pear trees in the Experimental plots were killed.

Very little planting was done at the station last spring, in fact no stock was furnished by the Department. All blanks, where trees had been killed or died, was filled in with the same variety, or in some cases new sorts were planted. A few new plums, pears, gooseberries and currants were added to the list by the manager. Considerable attention is being paid to top grafting, both in apples and pears, to ascertain if any improvement in hardiness, early bearing, or quality of fruit can be brought about by this method.

By J. G. Mitchell, (*Georgian Bay Station*).

Taking it as a whole, this has been a very good year for the fruit growers of this district. Although Plums were a complete failure, and, for reasons not very well accounted for, Apples, the main crop, were exceptionally good, very fine and clean and particularly well colored. Prices were about $1 per barrel on the trees, or $1.25 if picked. Many of the growers are taking the co-operative plan and handling them themselves, which is entirely the best way.

Cherries were also an abundant crop, of the very finest quality. Prices being well maintained, they were a very profitable crop. Small fruits are grown here for local requirements only, which was quite strong, still there was sufficient for all demands and the quality was very good.

Fungi and Insects were very little in evidence this season, only the Codling Moth doing much damage, and this mostly in the uncultivated or unsprayed orchards. There has been a great deal more care of the orchards since the advent of co-operation. Growers are finding that the orchard, if properly managed, is the best investment they have, and will pay the largest dividend on the time and labor expended.

By G. C. Caston, (*Simcoe Station*).

Many of the apple trees in this section, my own included, are seriously affected with Oyster Shell Bark Louse. I intend to try the lime whitewash, but I have more faith in a thorough scrubbing with lye. The whitewash is an easier method, if it is only as effectual.

I think a trial should be made of arsenite of lead at the stations as a poison for Codling Moth and leaf-eating insects. Something that will stick better than Paris green is needed to be effective against these pests, especially in a rainy season.

By J. L. Hilborn, (*Southwestern Station*).

Some Early Richmond Cherries are grown here, and, as usual, were a fairly good crop but owing to the rainy weather at the time the fruit was ripening, it was soft and juicy and did not ship well. Much complaint was received from receivers of this fruit that it arrived in a wasty condition, and would not stand up. This variety is not very satisfactory either to the grower, dealer or consumer. The Montmorency is an excellent variety here and yields a good crop almost every year, and is very satisfactory to all, but the leaf spot has been very bad on all varieties of sour cherries the last few years, and unless some remedy is found to check it, serious results to this crop are imminent. Sweet Cherries of nearly all varieties were an excellent crop and ripened up in good condition.

By C. Chapman, Judge, Ont., (*New Ontario*).

I have received the following list of trees for testing in this locality, viz.: Apples, Transparent, Astracan, Duchess, McIntosh, Charlamoff, Wealthy, Gideon, Transcendant, Hibernal, Hyslop, Whitney, Martha.

Plums: Burbank, Chabot, Red June, Hawkeye, Stoddart, Wolf.

These trees are doing well, and looked well at the beginning of the winter. I have wrapped them with tar paper to keep the mice away. I am doing everything I can to make them succeed, and I think they will. A lecturer from the O. A. C. has seen my fruit plot and says I have the best object lesson fruit planting in Northern Ontario. The small fruits have not done so well, but dried up a good deal in arrival, through delay in transportation.

APPLES.

Notes by W. H. Dempsey, (*Bay of Quinte Station*). ...

The apple crop has been very disappointing again this year. The crop being so light last year, the growers were counting on a heavy crop this year, and were still holding out hope when the trees came into bloom, as the amount of bloom was not very heavy, which in the past has been an indication of a fair crop; but the bloom dropped and the embryo fruit also, leaving a very medium crop of fruit to be still further thinned out by the ravenous worms and insects. Probably the most destructive of the evils were the Codling Moth and the Fungus, while in a few localities the Apple Maggot was also very destructive, commencing on the early varieties such as Astrachan, Duchess, Wealthy, and on down through the winter varieties, leaving its mark of destruction as the varieties came into condition for it. These attacks caused the fruit to color prematurely and fall to the ground. Some growers were under the impression that the fruit was ripening on account of dry weather, but when carefully inspected, the cause was discovered. I think the loss to some orchardists from it alone would be fully 50 per cent. of the crop.

The only remedy I know of is to gather the fruit and destroy it.

Where the grower did not follow up careful spraying the trees suffered very severely from the Oyster-shell Bark-louse, which seemed to find the weather conditions most favorable for it. Many young orchards will be almost worthless from the effects of it.

Where trees were grown very rapidly, making a somewhat spongy growth, the Fire Blight appeared, causing a goodly portion of the foliage and young growth to die.

Ink Spot helped materially in supplying apples for the evaporators, probably more conspicuous on Greening and Tolman. Apple spot was very bad in uncared-for orchards on Snows.

The man who takes pride in his orchard and thoroughly sprays and cultivates it, does a great work in maintaining the name for Canadian apples, and should have all the assistance that can be given him. This has been brought more to my notice this season through the co-operative work that I have been connected with. In such instances it was possible to ship 90 per cent. of the crop; where not specially cared for less than 50 per cent. could be exported on account of fungi, Codling Moth, Curculio bites, which caused the apple to be irregular in shape and very poor even for the evaporator or canning factory.

Probably the only remedy for this condition is the co-operative company for handling these products, where each grower gets pay for just such fruit as he produces. If he grows number one, he gets number one pay; while if content to grow a large per cent. of No. 2 and culls, his income will be accordingly low. This can never be remedied by the so-called apple buyer who buys by the lump, good, bad, or indifferent; the pay is the same for all. But the evil does not stop here; the buyer is going to try and make a large percentage of No. 1's out of those and escape the Government inspectors if he can, and get them on the foreign market and destroy the demand for the good, honest, straightforward packs that are being put up by the careful growers and co-operative associations.

We notice these unscrupulous buyers trying this more and more every day, putting on grade marks of A, B, C, in place of Nos. 1, 2, and 3,

pretending they are shipping locally to have them repacked in U.S.A. before going forward; but fortunately very few have got past our wide-awake inspectors in this way.

It is pleasing to note the number of fine orchards in the most choice locations, as a rule with natural drainage, which have been carefully pruned and cultivated, while a few orchards that were planted in very unsuitable locations simply because it was more convenient to the buildings, are in an unhealthy condition, having cold, wet sub-soil water standing on the surface until late in spring. One of the greatest drawbacks in this district is the poor choice of varieties the growers have made for their particular locations; for example, the Jonathan, an excellent dessert apple, but far too small for profit, averaging about two inches in diameter.

One orchard had fully one hundred barrels of Golden Sweet; it was impossible to market them in the short time that they were in prime condition.

Mann is not very productive; the trees sun scald badly, making an unsightly appearance alongside of other good varieties. St. Lawrence fruits heavily but very little of the fruit is perfect, making a small percentage of No. 1's and is seemingly not wanted in foreign markets; besides I notice many other varieties that are not suitable for these locations.

Spy seems to be doing well in nearly all the orchards.

Golden Russet is not doing well except in a few orchards; it seems to require special location and conditions. The best I saw was on a point running out in the Bay of Quinte, exposed to the heavy winds. The soil is a clay loam, the fruit was very large, rich golden in color and showing a large percentage of No. 1.

Ben Davis was found in every orchard but is not a success in all; but I think it comes the nearest to being a success in every location of any variety. The locations where it was not doing well was apparently a cold and wet subsoil, where frost comes early in fall and late in spring, or on very dry gravel but where little moisture is maintained during the growing season.

The other varieties similar to Ben Davis, such as Cooper's Market and Gano, averaged far too small to be of any value compared to the former and seemed to be more subject to the different diseases common to the apple.

Cranberry: In a few locations that seemed suitable, this variety gave remarkably fine crops this season and sold very readily at good prices; but in other locations I found old trees that have never done anything.

Blenheim: Seems to be another variety that needs a special location to be profitable. I only found one block of them that did anything this season and that was on top of a high hill, soil a clay loam apparently no different from any other except it gave the finest fruit to be found in this locality.

Tolman Sweet: Seemed to be in all the older orchards and fairly well loaded, but fully 90 per cent. of the fruit was defective on account of the many insects and fungi affecting it. I have had great difficulty in diposing of them at fair prices, although they are the best all round sweet apple that I know of.

Baldwin: This is a variety that has not been so largely planted as one would expect, and, like the Cranberry, seems to require a special location to be profitable. In a few orchards the Esopus Spitzenburgh was doing remarkably well, bearing a good crop for the season of that good old rich high quality apple brings good prices in the markets. It would certainly pay the grower, where they can grow it successfully, to plant more of it and less of the poorer kinds.

In Rawdon Township I found several orchards of that beautiful apple the McIntosh Red, which are certainly very profitable; the fruit was of very large size, high color, and equal to any I ever tasted in quality, which sold at good prices, also the Fameuse (Snow) were equally good in the same orchards.

There was one small block of Baxter that was fairly well loaded with large, highly colored fruit, but when packed nearly half of the bulk had to go to the evaporator on account of fungi and Codling Moth.

King seems to be one that will not pay; I find it in the most favored locations and yet without fruit. I only had about thirty barrels in the twelve thousand handled this year, which is extremely small for the number of trees.

Greening in many orchards bore well, but the fruit in some sections was badly infested with ink spot which made it only fit for the evaporator; in other orchards it was practically clear and sold at a good price for this year.

What few trees of Gravenstein I saw were fine; it is one of the fall apples that has been neglected; not planted as largely as it deserves, being of high quality and productive each alternate year.

There were a very few small blocks of Longfield; it was a great mistake that they were ever introduced into this section; the tree is a very slow grower on account of its fruiting heavily; the fruit is small, more like crab-apples, too small for the evaporator and of very poor quality; unless heavily thinned it is not worth growing in this section.

Fallawater: Not very many trees grown, only found in a few orchards, and as a rule the tree shows sun scald and unhealthy conditions. It produced a fair amount of fruit which was badly infested with Codling Moth and Fungus. Many medium sized apples turn a bright lemon yellow color that were green when picked, but become mellow and punky after being in the storage for a month, causing a great waste. I would not recommend planting it with the idea of shipping it for the winter markets.

Nonsuch was doing fine wherever it had any chance, and sold at good prices; it requires to be picked early and, like the Cranberry, it falls to the ground early.

Duchess were very fine in nearly all locations and sold for good prices; it paid the grower well.

Wealthy as a rule ran very small on account of overloading, making probably one-half not fit for shipping; it would pay well if the growers were to thin it, taking off one-half the crop when the fruit is half grown; the balance would increase in size enough to make the same number of barrels.

The crop of apples in the experimental orchard was a failure.

Aikens Red: Only two apples, but the crop of 1905 kept well and were very fine in March; it is of medium size, bright red, and of good quality.

Banana: Bore a few apples which were bright as usual; the fruit of 1905 was in good condition in March, and of good quality.

Coo's River: One apple; the fruit of last year kept very good through January in the fruit house, but did not retain its quality.

Milding: Still making vigorous growth but no apples.

Sutton's Beauty: Is making very slight growth; unhealthy in appearance; very few apples; fruit of 1905 did not keep well later than January; quality no better than Baldwin.

York Imperial: Not fruiting; 1905 apples were in good condition in April; think it would take well on the markets, but it has not been very productive either top grafted or in trees.

Winter Maiden's Blush: Very few apples; the fruit of 1905 did not keep through January and was of medium quality.

The fruit buds of the cherries, plums and peaches were all winter killed, therefore no specimens this year. Trees all in fairly good condition except peaches, which were frozen back.

Notes by Harold Jones, (*St. Lawrence Station*).

The following notes are on varieties not reported in 1904-5:

Aiken's Red: Planted 1897; tree fairly hardy; a wide, spreading grower; dark green foliage; fruit, small, dull red, of fair quality, but subject to spot; not desirable.

Blunt: Planted 1897; a round, compact, vigorous, healthy tree; hardy, ripening its wood well; fruit, large, 3 to 3½ inches, yellow, striped and splashed with red; a nice looking apple, not prolific as yet.

Boiken: Planted 1897; fairly hardy and vigorous, but has not proved of any value yet.

Canada Baldwin: Planted 1896; continues to show great vigor and hardiness, but comes into bearing slowly. If this tree proves prolific, it will be valuable for this section, as the coloring is very high, and it is an attractive apple on the market.

Clayton: Planted 1897. This tree is not vigorous, and its fruit shows no desirable qualities.

Downing's W. M. Blush: Planted 1896; tree vigorous, upright, but does not ripen off its wood well; fruit, medium to large, waxy white, with blush similar to Fall Maiden's Blush.

Fannie: Planted 1897; tree upright, slow grower, injured to some extent every winter, not hardy.

Gano: Planted 1900; tree and growth similar to Ben Davis; fairly hardy, but shows some injury to terminals; fruit very highly colored and very attractive; worth further trial.

Hurlbut: Planted 1896; a fairly hardy, vigorous tree, but fruit of no value; undesirable in this section.

Milwaukee: Planted 1896; this tree maintains its many desirable qualities. It has been giving me annual crops since 1901, and has come through the severe winters just passed without any injury whatever. The fruit is green, splashed with dull red at harvest time, but later takes on a bright yellow and brilliant red in the storehouse; a prime favorite as a cooking apple all winter, keeping well through March. I consider this apple a valuable addition to our limited supply of winter fruit, and it will no doubt be largely planted when its qualities become better known. Can be classed as desirable.

Magog Red: Planted 1896; tree an upright, moderate grower; fruit undersized for the variety and poorly colored; not desirable here.

Milding: Planted 1897; a spreading, fairly vigorous tree, hardy; fruit medium to large; promising.

N. W. Greening: Planted 1896; tree fairly vigorous, forming a round, compact head; fairly hardy, but not ripening its wood well at the tips; fruit dull green, sometimes with faint blush; uneven in size, running from small to very large; of fair quality, but unattractive in appearance; of no special value.

Parling Beauty: Planted 1898; tree vigorous and hardy, forming a close, compact head; fruit large and handsome; worth further trial.

Romanstem: Planted 1898; a close, compact tree, with slender twig; fruit of poor, undesirable appearance and quality; of no use in this section.

Salome: Planted 1896; tree hardy, compact, round close head; fruit small, undeveloped and poor in quality; not desirable.

Switzer: Planted 1897; a hardy, vigorous tree, coming into bearing early; season about he same as Duchess, and of no value compared with that variety.

Shackleford: Planted 1897; tree of only moderate vigor; fruit small, poorly colored and greasy; not desirable.

Wolf River: Planted 1896; a hardy, vigorous tree, of promise; a fair crop of large to very large, handsome apples; an apple that extends the season of the Alexander, and one that sells well on the market; a good show apple and in demand for decorating shop windows; hardy and promising.

Winter St. Lawrence: Planted 1896; tree a vigorous, healthy grower; comes into bearing slowly; fruit medium to large; attractive and promising.

Windsor Chief: Planted 1896; tree of poor vigor and injured to some extent by frost; not very promising.

Desirable varieties for St. Lawrence Valley, according to season:— Yellow Transparent, Brockville Beauty, Russell, Duchess, Chenango, Alexander, Wolf River, Wealthy, Scarlet Pippin, Fameuse, McIntosh, Baxter, Canada Baldwin, Blue Pearman, Milwaukee, Golden Russet, Scott's Winter. The following varieties are not recommended:

Aikens' Red, Blenheim Pippin, Betchel's Crab, Clayton, Downing's W. M. Blush, Dartmouth Crab, Fannie, Gideon, Hamilton, Hurlbut, Hibernal, King, Longfield, Late Strawberry, Mann, Magog Red, Mammoth Black Twig, N. W. Greening, Ontario, Onion Crab, Palouse, Roman Stem, Salome, Sutton's Beauty, Shackleford, Waxon Crab, Winesap, Yate's Red.

Notes by A. W. Peart, (*Burlington Station*).

In 1901, thirty-nine varieties of Southern State apples were sent here in the form of scions. These were top-grafted on four trees of Roxbury Russet. Six varieties failed to grow, and of the remainder, twenty-six varieties bore fruit this year, as follows:—

Belmont: Apple small to medium in size, roundish flat; yellow; stem medium length, cavities shallow; flavor sub-acid, moderately juicy; no spots; some Codling Moth; fair looking; season, early winter. Yield, 6 qts.

Bonum: Very small; red; stem long, cavities shallow; oblong-round; sub-acid; no spots nor worm holes; very few apples. Season, late winter.

Coffet: Small; yellowish-red; short stem; roundish-flat; sub-acid; very few apples; no spots; wormy; poor looking; late winter.

Cullesago: Small; sooty yellow; long stem, medium cavity; sub-acid; wormy; no spots; poor looking; very few apples; season, early winter.

Gill's Beauty: Red, slightly tinged with yellow; small; roundish; long stem, shallow cavity; skin fine-grained, flavor sub-acid; no spots; very few worms; rather a good looking apple; season, mid-winter; few apples.

Gilbert: Small; round; yellowish-red; long stem; sub-acid; wormy; no spots; very few apples; not attractive looking; season, late winter.

Hatchell's Seedling: Very small; dark red; roundish conical; medium skin; sub-acid; very few apples; season, late winter.

Huntsman: Medium size (about that of Baldwin); roundish-flat; slight-

ly ribbed; very yellow skin, slightly mantled with crimson; medium cavity; stem medium length; flavor, sub-acid; rather handsome apple; no spots; some worms; very few apples; season, mid-winter.

Hanseley's Winesap: Small; roundish conical; medium stem, medium cavity; red; sub-acid; spongy; neither worms nor spots; yield, 36 quarts; good-looking; season early to mid-winter; clings tenaciously.

Highfile: Small to medium; roundish conical; short stem; dark red, covered with rich purple bloom on the sunny side, like that of the black grape; very attractive and handsome; drops rather easily; flavor, sub-acid; no spots; a few worms; season, early winter; yield, 18 quarts; a promising variety.

Kentucky Tolenstein: Medium to large; roundish-flat; yellow striped with bright red; slightly ribbed; long stem; cavity medium; sub-acid, pleasant flavor; no spots; no worms; only a few apples; a striking, attractive looking apple; season, mid-winter.

L. S. Pearmain: Flat; small to medium; short stem; yellowish red; sub-acid; medium cavity; some spots and worms; yield, 6 quarts; season, mid-winter.

Little's Red Winter: Small; roundish flat; long stem; red, marked with slight yellow; medium cavity; sour; juicy; some worms and spots; few apples; fair looking; season, early winter.

Minnesota Pippin: Small; oblong-round; very short stem; yellowish red; sour; some juice; no worms; some spots; yield, 24 quarts; season, early winter.

Mammoth Pippin: Small to medium; yellow; sub-acid; cavity medium; short stem; fine-grained skin; few worms; no spots; very few apples; season, early winter.

Milam: Small; yellowish red; medium stem; moderate cavity; roundish flat; sub-acid; no spots nor worms; very few apples; late winter.

Malinda: Very small; dull red; cavity medium; medium stem; round; sub-acid; few apples; season, late winter.

Nickajack: Medium size; roundish flat; red, mottled with yellow; cavity moderate; stem medium; sub-acid; few worms and spots; yield, 6 quarts; fair looking apple; late winter.

Ozark: Small to medium; rich, dark red color; stem medium; cavity moderate; skin fine in grain; roundish conical; sub-acid; some worms and a few spots; a handsome apple; yield, 1½ bushels. This apples hangs very tenaciously, and this year promises well; season, mid-winter.

Pennsylvania Red Streak: Small; yellow, striped with red; short stem; sub-acid; roundish flat; some worms; no spots; few apples; season, early winter.

Red Limbertwig: Small; greenish red; oblong; medium stem; shallow cavity; sub-acid; some spots and worms; yield, 12 quarts; unattractive looking; season, mid-winter.

Rebel: Small to medium; roundish flat; yellowish red; long stem; moderate cavity; sour; juicy; some worms and spots; few apples; good looking; season, early winter.

Wandering Spy: Medium to large; red; cavity deep; stem medium; roundish; sub-acid, pleasant; small core; no spots; very wormy; rather good looking; yield, 3 quarts; season, late winter.

W. C. Limbertwig: Small; roundish conical; reddish yellow; stem long; cavity shallow; sub-acid; a few spots and worms; fair looking; yield, [illegible] quarts; season, mid-winter.

YELLOW HORSE: Medium to large; smoky-yellow; roundish flat; slightly ribbed; cavity very shallow (almost like Pewaukee in that respect); very short stem; drops badly; sub-acid; juicy; good flavor; not attractive looking; few apples; season, early winter.

Of the above varieties the only ones that were promising are the Ozark, Highfile, Hansley's Winesap, and Kentucky Tolenstein, the Ozark being the most so of any.

All of the apples appear to be hardy, and most of them of a sub-acid flavor and lacking in juice. At the present time (Nov. 26th), all seem to be winter varieties.

NOTES BY G. C. CASTON, (*Simcoe Station*).

There is comparatively little to report that is new this year; but some notes on varieties that have been under test for some time may prove interesting and valuable to those who intend planting fruit in this district. There was nothing received for planting here this season except a new variety of raspberry called the Eaton, which is referred to elsewhere. The apple crop was very irregular in this locality and lacked uniformity. Some orchards were fairly well laden, while others were almost barren. This irregularity applied to all varieties of winter apples, rather than early kinds, as Duchess and most varieties of fall apples were fairly good. All kinds of apples were cleaner than usual, even Snows were much freer from fungus scab than they usually are.

Notes on varieties of Apples:

SPY: The king of all the winter apples; the most saleable of all apples in the home market. I would say to all intending planters, plant hardy, healthy, thrifty-growing trees, and top-graft them with Spy. When they come into bearing you will have an apple that will never go begging for a market. This is the advice I gave twenty years ago, and I would emphasize it to-day. I have them doing well on Yellow Transparent, on Haas, on Wealthy, on a dozen varieties of Russian, on Pewaukee, and on Tolman Sweet. I would recommend the latter especially as a stock for top-working Spy on. The most unsuccessful I have tried are Astrachan and Russet. Do not use them when better ones are available. But to grow fancy Spys, top-grafting is not all of it. Regular pruning, cultivation, spraying and feeding with proper manure, are all essential. But the more fine Spys you have the better you can sell, and the more money you will get. They always help to sell your other apples. The Spy is a good investment.

BALDWIN: I am growing this apple top-grafted on Russian and other stock. I don't believe it will ever do as well as the Spy here, even top-grafted. The extremely cold winter of 1903-4 gave some of them a severe set-back, while top-worked Spys were unscathed. However, they are coming along nicely now, and some of them are beginning to bear, but I believe a few years' further test will indicate fairly well just how well the Baldwin will do here top-worked on hardy stock.

KING: Does it pay to grow Kings anywhere? I doubt it. While top-grafting improves its bearing, making it more productive, yet it is hopelessly discounted by the Spy in bearing.

GREENING: Does well top-grafted, and this good old variety has not lost its popularity, and is not likely to as long as it can be grown of good quality. And that is simply a question of top-grafting, spraying, pruning and proper tillage in this locality.

GANO: I still like this variety better than Ben Davis, to which it is no doubt closely related, although in my estimation a much better apple.

There are two varieties of winter apples not much noticed in any former report, that I think now to be well worthy of consideration. One is Steele's Red Winter. This would be a good substitute for the Baldwin where that variety cannot be grown, as it is quite hardy, and while not of high quality, it is a good shipper, and will keep till June. The other is the old "Seek," which does fairly well here, and will do exceedingly well when top-grafted, and is a very saleable apple of good quality.

YORK IMPERIAL: This is one of the new varieties that are promising. It has borne a few specimens this year, and promises to be a useful winter variety. If it should prove to be desirable as a good market apple, it should be top-grafted, as the tree is tender.

BOIKEN: I am still pleased with this variety. It is sure to be a profitable kind, as the trees started to bear two years after planting, and have borne regularly ever since. The tree is fairly hardy and the apple is a good shipper, and will keep as long as Ben Davis. The quality is only fair, but its keeping and shipping qualities, coupled with its early and regular bearing, would commend it.

SHACKLEFORD: I see that Mr. Dempsey places this one on the list of undesirable varieties. I will not do that yet, but designate it as promising here, and worthy of further trial.

MCINTOSH: This cannot be said to be a success here. It does not bear regularly, and it is one of the worst varieties for scab, worse, even, than Snows.

SHIAWASEE BEAUTY: I regard this variety as the best of the progeny of the Snow, and will prove an excellent substitute for that variety. About the same season as the Snow, it bears well; the fruit is clean and much larger, and although it has not the Snow flavor so distinctly as Louise or the McIntosh, yet it is an excellent Christmas dessert apple. I think, as it has had several years' trial, it is safe to recommend it to intending planters as an excellent substitute for the Snow.

WOLF RIVER: This is going to prove a profitable apple for this section. A very healthy, thrifty, hardy tree, bears early, a good yielder. Fruit very large, but smooth, clean, and takes on a beautiful color, and is an excellent cooker. The fact that I intend planting a number of trees of this variety in the commercial orchard indicates what I think of it.

CANADA BALDWIN: This variety fruited a few specimens this year. I would call it promising, but it needs further trial.

Two Russian varieties fruited this year which might prove useful for localities farther north, as they are hardy. One called LARGE ANIS is of the Alexander type, but later; the other, PIPKA APORT, is above medium size, flat in shape, skin dark green, overspread when ripe with dark red, and would keep till midwinter. They are not recommended for this section, as there are many varieties of the same season and of better quality growing here.

NORTH-WEST GREENING: A promising variety; needs further trial.

PEERLESS: A seedling of Duchess, and one of the very best cooking apples on the list. A clean, handsome apple. Season, September-October.

MARTHA: In Crab apples, I have fruited a dozen more varieties, and my preference is for the Martha. Good for culinary purposes and clean, bright, handsome in color.

Notes by A. E. Sherrington, (*Lake Huron Station*).

As stated in general notes, apples were a very satisfactory crop, and with the exception of the Codling Moth, the crop was harvested and disposed of at good prices. The only difficulty in this District, as no doubt in all others, we have too many undesirable varieties for successful apple culture. The crop at the Station was a very heavy one, quality good, a few more of the new varieties fruited this season.

Bismarck gave a barrel per tree; this variety is of the Alexander type, but a better keeper.

Northwestern Greening, about one barrel per tree, of large well formed apples, but the quality is rather poor, color green, undesirable for market, either home or foreign. Tree vigorous and hardy.

Starr, fruited for the first time; fruit large, resembles Colvert, but quality much better, season a little earlier.

Shackleford, produced a few samples of fine appearance; tree vigorous, and hardy, but the quality of the fruit is too low for it to ever become a profitable market variety.

Stark, fruited for the first time; fruit large, resembles Colvert, but hardy, and an early bearer, but the fruit is not equal in color to the Ben Davis, quality about the same.

None of the newer sorts are equal to the old standard varieties, and in my opinion, if we had more of such varieties as the Baldwin, Spy, King, and a few others, it would mean thousands of dollars to this country.

The trees top grafted are all doing well, and some interesting information may be looked for in course of time.

Notes by J. G. Mitchell, (*Georgian Bay Station*).

This has been a very good season for apples, and we have had a great many varieties in bearing. So far as this district is concerned, there are none of the new varieties which can displace the best of the old well tried kinds.

As experimenter, and having had thirty years growing apples, also buying and handling in a large way, I have often been asked to recommend what to plant. Location and conditions are so different in even a limited area that it is scarcely safe to advise. For my own planting in commercial orchard I would use the following: Gravenstein, Baldwin, Spy, and Mann, with a few Ben Davis. The last four are the long keepers, and the real money makers of the orchard. Not only do they sell for the highest prices, but they bear enormous crops which many others of fairly good quality seldom do.

Notes by Chas. Young, (*Algoma Fruit Station*).

The past season, including the winter of '05-'06, has been peculiar in one respect; in everything, except plums, the show of blossom in the spring was good; with the exception of a frost after the buds began to swell the weather for setting fruit was favorable. About the usual proportion of fruit set, but began to drop and continued so through the season. Fall fruit was a full crop, but winter fruit was poor in quantity, although the quality was good. We are still looking for that first class winter apple, but it has not turned up yet. The old saying that Hope deferred maketh the heart sick, does not hold good in our case, but acts as a spur to further exertions.

and the want of a so-called winter apple is not so great a want after all as it might appear to those in the most favored fruit sections. When I state the fact that on the 26th day of March, 1906, we finished the last barrel of Alexanders in perfect condition for dessert and of a finer texture and better quality than those grown in the south, you will see that, even if we have to depend on ourselves, we are not so badly off after all. Since I commenced fruit-growing in Algoma, 23 years ago, I have made several mistakes. Knowing this to be a cold country in winter, I located my orchard in what I considered a nice sheltered valley on naturally dry soil; that was my first mistake. The next was planting varieties that we have since found to be useless here. About that time the tree agent came round and often, to get him out of the house, I would purchase a few trees; by and by the little sheltered hollow was filled up and the trees were planted on higher ground. They did, and have continued to do so, very much better on the high ground, that I have always advised planting on the highest ground, without actually selecting a hill top. Another mistake was planting a wind break; it was all right for a few years, but now the spruce, of which it was composed, are 40 feet high, and are destroying the rows of fruit trees next to them. A wind break is desirable, but should be kept well away from the fruit trees. Another mistake, which it took several years to be convinced, was the idea that by working a tender variety on a hardy stock that the top would be sufficiently hardy to endure the frost in winter; this I am now satisfied is not the case. A Baldwin top on a McMahon stock remains a Baldwin top still and no hardier than on its own root as far as a frost resisting power is concerned. This good may result,—a trunk, liable to sun scald, may be made better by working on a hardy stock. Another mistake, it is quite possible to have the ground too rich in nitrogen in a young growing orchard; a long sappy growth is the result with wood not fully matured before winter, which is absolutely necessary in a cold climate. I have lost several trees from this cause. I have about forty varieties of winter apples top grafted principally on Longfield, mostly Russians, doing nicely, besides some local seedlings. We may get something out of them.

I would like the Board to send me scions of Milwaukee, Boiken and Peerless for top grafting. I would also like to try again Spy and Ontario. These last, although frozen out in the winter of 1893-4, I am not satisfied to discard. If the Ontario does freeze down once in twenty or twenty-five years, it bears so early, and has, until this winter, been so satisfactory, that I find nothing to take its place. I propose top working it on McMahon or Longfield stock. I also want to try the Herbert Raspberry.

From your long experience in the Niagara district you know just what varieties bring the most money per tree, but here we are just finding this out. An immense quantity of apples were shipped from the dock here last fall at prices of $2.25 to $2.50, buyers finding the packages and paying freight, 11 qt. baskets of Astrachan and Duchess Transparent at 25c. to 35c., including basket.

Between what was put on last spring and this spring I will have about 100 varieties, all coming on together, which will give me a better opportunity of observing the individual behavior of each than if the work was spread over a long series of years.

I have delayed replying to your letter for this reason: For some years, on the 20th day of March, I have sampled apples kept over winter just to find out their keeping qualities; they have all kept in an ordinary cool cellar under the house; the fruit was not selected, only no apple showing bruise was allowed; the following are a few results that may interest you:

Alexander: Past its best for eating, still fit for cooking.

Wolf River: Very good eating, will possibly keep nearly a month longer.

Golden Russet: Skin all shrivelled up, slack in the package, not satisfactory, do not think this apple matures sufficiently.

McIntosh: Good up until the end of February, slightly past its best now.

Princess Louise: A most satisfactory apple every way, in fine condidition now, this should be added to our list for Algoma.

Snow: Past its best, 50 per cent. decayed.

Longfield: All good, but the apple is too small for market.

Scott's Winter: Will keep for months yet, but too small; not profitable to grow.

Gideon: 4 per cent. rotten at the core, past its best.

Switzer: Nearly all gone; no use to keep over.

These are a few of the principal kinds grown here, and this report may interest you in regard to their keeping qualities when grown in the north.

A select list of varieties of apples for cooking in the Algoma District, named in order of ripening: Yellow Transparent, Charlamoff, White Astracan, Red Astrachan, Duchess, Oriel, Basil the Great, Alexander, Wolf River, North Star, St. Lawrence, Wealthy, Gideon, McIntosh.

Late Winter: Scott's Winter, Golden Russet, Arabka, Baxter, Pewaukee, Princess Louise, a winter apple here. To this may be added Milwaukee and Northwest Greening, but I have not fully tested them yet.

A list of varieties of apples not considered worth further cultivation in the district represented by the Algoma Fruit Station: Spy, King, Baldwin, Tolman, Blenheim Orange, Rolf, Sweet Bough, Ben Davis, Stark, Bismarck, Mann, Rhode Island Greening, Fourth of July, Early Harvest, Lady.

Undesirable Fruits.

In addition to the list of apples enclosed, and taking a commercial view only, I would include all Grapes, Pears, and Blackberries. For these the general market will have to depend on a supply from further south. To a limited extent or for private use a few of each may be grown. There is always a certain amount of pleasure, not to be counted by dollars and cents, in growing your own fruit for your own table.

BLACKBERRIES.

Notes by A. W. Peart, (*Burlington Station*).

To the Undesirable Varieties reported in 1904 the two following ones are also added:—Early King, as being too tender, and Humboldt, as being too small as well as tender.

The Hardy Varieties are Agawam, Ancient Briton, Eldorado, Stone's Hardy, Taylor, Snyder, Western Triumph, Wachusetts.

Commercial List: Ancient Briton, Agawam, Snyder, Taylor, Western Triumph.

AGAWAM: Cane, dark red, vigorous, upright grower, hardy and productive; berry roundish, oblong, medium size; first and last ripe, July 31-Aug. 20; yield per row, 18 feet, 6 quarts.

ANCIENT BRITON: Cane, dark red, moderately vigorous, upright, hardy and productive; berry oblong, conical, medium size; first and last ripe, July 28-Aug. 15; yield, 18 feet row, 7½ qts.

ELDORADO: Cane, brownish red, upright, spreading, medium vigor, hardy and fairly productive; berry medium to large oblong, conical; first and last ripe, July 31-Aug. 20; yield, 18 feet, 4½ quarts.

ERIE: Cane, greenish red, moderately vigorous, spreading, slightly tender but productive; berry medium to large, roundish, conical; season July 31-Aug. 20; yield, per 18 feet, 5½ qts.

HUMBOLDT: Cane, reddish green, upright, tender, medium vigor; berry long, slender, small to medium; first and last picking, July 20-Aug. 5; yield, per 18 feet, 4¾ quarts.

KITTATINNY: Fully described in report of 1904; first and last picking, Aug. 5-Aug. 25; yield per row, 5 quarts.

SNYDER: Also fully described in report in 1904; first and last picking, July 28-Aug. 18; yield per row, 7 quarts.

STONE'S HARDY: Cane, brownish red, strong upright grower, hardy and productive; berry oblong, oval, small to medium; first and last picking, Aug. 2-22; yield per row, 4½ quarts.

TAYLOR: Cane, greenish red, moderately vigorous, upright, spreading, hardy and productive; berry medium, oblong oval; first and last picking, Aug. 2-20; yield per row, 5 quarts.

WESTERN TRIUMPH: Cane, dull red, strong grower, upright and hardy, very productive; berry medium oblong, round; first and last picking, Aug. 2-20; yield per row, 7 quarts.

NOTE.—A row of bushes 18 feet in length is taken as the basis of yield in all of the above varieties.

Blackberries do not succeed up here; they either winter kill or suffer with the drouth in the summer. Two varieties are doing very well, Eldorado and Snyder.

ELDORADO: Plant, strong and vigorous, half hardy, fruit large, without a core, quality good to best; yield, 109 oz.; ripe Aug. 6th.

SNYDER: Plant, vigorous and hardy; fruit, small to medium, rather dry and hard; yield 166 oz.; ripe July 6th.

NOTES BY G. C. CASTON, (*Simcoe Fruit Station*).

All small fruits, with the exception of strawberries, were a failure this year. Blackberries did well here up to the cold winter of 1903-4, but have never done as well since. This year the absence of snow and the soft, unseasonable weather of January, followed closely by hard, cold weather, so injured the blackberries that they bore little or no fruit. This is a vexatious business, when one spends time and labor pruning and cultivating, and gets nothing for it. However, given our usual quantity of snow, and an average winter, I quite hope the blackberries will again do well. For the first few years of fruiting, I had some crops which could not be excelled for quantity and quality. I am only growing two varieties, Agawam and Eldorado, and I do not feel like discarding either of them yet. Agawam is the hardiest of the two.

Notes by Chas. Young, (*Algoma Station*).

Blackberries have never been satisfactory. I made a mistake in planting by setting a double row along a fence, where the snow covered them five feet deep in winter. I did this with the idea of protection from frost. That part was all right, but in spring, when the thaw came, the heavy weight broke the canes off by the ground, the few berries that did form usually dried up before they ripened. I have selected two varieties, which I consider the hardiest and most likely to succeed, Eldorado and Agawam. In 1905 I received Snyder, Kittatinny, Erie and Gainor, and planted them in what I consider a more favorable location, topped the canes and cut the laterals back in the fall. They have made excellent growth, and went into winter in fine shape. I hope to be more successful, but, in the meantime, I am satisfied that commercially they will not be a success here and I would not advise planting any of them. Even if successful there is no present demand for the fruit.

CHERRIES.

Notes by Linus Woolverton, Secretary for Ontario Fruit Stations.

The Cherry crop has been more satisfactory this season than for two seasons past. Two of the worst evils of the cherry orchard were almost lost to sight, viz., the aphis and the rot. In some orchards the aphis has been reported, but in our experimental plot not one is to be seen, a great contrast with some other years in which they were so numerous as to render the crop almost worthless.

The rot has not been so little troublesome for years; why, I cannot tell. Frequent rains are usually assigned as the cause, but these have been as frequent as ever and yet we have fairly good fruit. Even the Bigarreaus, a class most of all subject to rot, have this season given us a large percentage of clean fruit.

Spraying with Bordeaux is yearly becoming more and more highly appreciated as a remedy for rot. This season is the first in which I have harvested really fine Windsors. It is the most subject to rot of all the Bigarreaus, and I had been deeply disappointed over them, having planted an acre to this variety alone. This season's experience makes me think I can save them by faithful spraying. I only gave them one application, but that was a thorough one, just after the fall of the blossoms. On several unsprayed Windsor trees the fruit was entirely worthless from rot, and no attempt was made to gather the fruit, but a plot of 100 trees that had been thoroughly treated yielded a good crop of magnificent cherries.

This season I laid down a part of the cherry plot to grass, but I am not pleased with the result. Montmorencys in sod gave much second grade fruit, while those in well cultivated soil were fine. Such very vigorous growers as Schmitz, Yellow Spanish and Windsor may succeed in grass, on sandy loam, for they go very much to wood if highly cultivated, but for slower growers I would favor the best of cultivation.

The old notion of planting cherry trees in the fence corners only and leaving them to shift for themselves is exploded. Cherries are a profitable crop and it will pay to give them the best of treatment.

Scarcity of labor for harvesting our fruit in Ontario, makes it unwise to plant too freely of any one kind. The wisest plan is to plant so as to have a constant succession, and thus employ a certain number of hands with some degree of regularity the season through. In cooking cherries I would plant about equally of the following three kinds to cover the whole cherry season, viz.: Dyehouse, which is earlier than the Richmond, and ripens about the middle of June; the Montmorency, the great main crop pie cherry, coming in about the first week in July, and the English Morello, ripening about the middle of July. The later is not so much in favor as the other two; still it is an excellent cooking cherry, and prolongs the shipping season about a week. This will give a month of cherry picking, and will occupy a gang of pickers from the close of strawberry season until raspberries are well upon us.

The picking of the cherry crop is the great bugbear in the way of growing it on a large scale; and yet a full crop of cherries is as easily and as quickly gathered as the same number of quarts of strawberries, barring, of course, the climbing. The usual cost of picking cherries is 15 cents an eleven-quart basket, when the crop is an average one; if not, about 20 cents.

Of the English cherries, it is a perplexing task to make out a list of varieties that are permanently desirable. They behave so differently in different seasons that one's ideas concerning their merits this year may be wholly changed next year. During the past forty years I have been growing a large number of varieties for both domestic and market purposes, and yet I am ever learning new pointers about them, and find my list of favorites becoming frequently modified.

For profit my favorites just now, to cover the season, are: Wood, Knight, Tartarian, Napoleon, Spanish, Elkhorn, and Windsor, named in the order of ripening.

For domestic purposes I would add Elton, Reine Hortense, Late Duke, Choisy and Schmitz.

Notes on Varieties.

The following notes are taken from my pocket note-book, made during the season in the orchard:

Abesse: Morello, imported from Russia, 1883, by Prof. Budd. Tree, slow in coming into bearing, and even then unproductive; fruit, dark purple; flesh dark with red juice; subject to curculio; ripe June 15th to 20th; of no commercial value.

Bruseler Braune: Morello; no crop; ripened about 20th July.

Choisy: Duke; ripened June 20th; tree vigorous, unproductive; short lived; fruit medium large, red, very rich, sweet and delicious; valuable for the amateur.

Cleveland: Heart; ripened June 20th to 25th; tree vigorous, usually productive, but this year a very small crop; very similar to Wood.

Coe: Heart; ripened end of June; tree vigorous and productive; fruit large, pale yellow with rich sweet delicate flavor, but too tender to be popular as a commercial sort.

Connecticut Black Heart: No fruit.

Downer: Sweet cherry; ripened beginning of July; not productive enough; color, red; flesh rich, sweet, melting and tender.

Dyehouse: Kentish pie; harvested June 20th; tree very productive; trees bent down with weight of beautiful fruit; fruit perfect; no rot, no curculio; a trifle earlier than Richmond and likely to displace that variety.

Eagle: Heart; harvested July 10th; trees very vigorous, not productive; yield 1906 better than usual; fruit nearly black; flavor rich and is excellent quality for dessert; not valuable commercially.

Early Purple: Heart; no crop; not profitable.

Elton: Bigarreau; followed Wood about June 26th; tree vigorous and productive; fruit pale yellow with red cheek, with sweet, excellent flavor; inferior to Wood and more subject to rot; quickly softens on reaching maturity.

Eugenie: Duke; season about third week in June; no crop; not very productive.

Hortense: Duke; ripened July 1st; a very small crop of magnificent samples; seems to be too irregular in bearing to be profitable in the commercial orchard; one of the very finest for the home garden.

Ida: Sweet cherry class; ripened end of June; tree medium productive; fruit not very large, much taken by birds; not profitable at this station so far.

Knight: Heart; ripened June 25th to July 1st; tree very vigorous and very productive; long lived, one tree at this station nearly fifty years of age, gave crop of six bushels; fruit large, reddish purple, sweet and excellent; no rot, no curculio; not subject to attack by birds; one of the best of the black cherries.

Late Duke: Duke; ripened first week of July; tree vigorous, upright, not very productive, no crop 1906; one of the finest of the Dukes for the home garden; resembles Royal Duke in experimental plot.

Lutovka: No crop; seems not to be very productive.

Koslov: A Russian Morello, with fruit very similar to English Morello, but the tree is a dwarf.

Dikeman: Late black Bigarreau of medium size; a long keeper.

Magnifique: Duke; ripened 18th July; gave a very small crop; seems to be only moderately productive; ripens unevenly.

May Duke: No crop.

Mercer: Fruit resembled Governor Wood, perhaps another name for the latter.

Mezel: No crop.

Montmorency: Pie; ripened 10th July; the last picking about 15th July almost worthless on account of curculio and rot. This is unusual with this variety, for in previous years it has hung a week after maturity without waste. Trees sprayed were much less subject to rot and curculio than those not sprayed. The fruit commanded ready sale at $1 a basket.

Montmorency Ordinaire: Similar to Montmorency.

Morello: Ripened 18th to 20th July; sometimes miscalled the Wragg, which is the old English Morello under a new name; dark red with colored juice; yielded a fair crop; trees somewhat recovered from the blight of 1905; a good commercial variety because it comes into the market when all other varieties are over.

Napoleon: Bigarreau; ripened first week in July; a good crop and less subject to rot than usual. When it can be grown free from rot, it is the most productive of all cherries, and the largest in size, unless perhaps we except the Yellow Spanish.

Ohio: Ripened end of June; a failure.

Olivet: Duke; ripened the end of June; a fine large cooking cherry, but the crop was very light; the trees have never yet borne more than a half crop, and they have been planted ten years.

Orel 23 (in our previous reports by error called Orel 28): ripened about end of June, about with Richmond; a fine yield of red, sour cherries, equal to Montmorency; tree very hardy. We judge it would be one of the best for profit in northern sections.

Ostheim: Scanty crop; did not pay for picking.

Purity: Pie; ripened end of June: a magnificent crop of clean fruit with few or no blemishes; tree loaded with fruit was a most attractive sight; possibly Dyehouse, sold under another name.

Richmond: Pie; ripened about middle of June; wasted rapidly where not quickly gathered and marketed; very much grown for market, but too perishable to be planted for principal crop; widely distributed from Richmond, Va.; Hogg thinks it a synonym for the Early Kentish; tree very productive; but apparently not very long lived.

Rockport: Bigarreau; ripened last of June; usually very subject to rot, but this season we harvested about two-thirds of a crop of No. 1 cherries; the flavor is subacid and not nearly equal to that of Wood; we do not recommend this variety.

Royal Duke: Duke; ripened last of June and beginning of July; very few cherries on the tree; usually an abundant bearer, and I count it the best of the Dukes for all purposes.

Schmidt: Heart; ripened first week in July; a failure so far as quantity is concerned; my trees, ten years planted, have borne scanty crops every year, so that the variety cannot be profitable; judging, however, by the size or beauty of the fruit and its excellent quality and high flavor, it has no equal as a dessert cherry, and should find a place in every garden for family uses. The fruit is jet black, of the largest size and high quality. Tree very vigorous (10); productiveness poor (4).

Sklanka: No crop.

Spanish: Bigarreau; ripened first week in July; a great success this year; it is usually very subject to rot, but is comparatively free this year from rot or curculio. Many of my trees are now nearly fifty years of age, and have reached a very large size. They have yielded very little sound fruit, for two or three seasons past, but this year gave a fine crop of beautiful cherries of the very largest size. This fruit is far the finest of the white Bigarreaus. The color is light yellow, with a blush on the sunny side.

Strauss Weichsel: Duke; ripened end of June; not profitable in the southern parts of the Province; tree shows itself fairly vigorous but not very productive; fruit dark crimson in color; juice colored; quality good; useful at the north on account of its hardiness.

Schatten Amarelle: Synonym for Shadow Amarelle.

Shadow Amarelle: Morello; ripened 10th to 15th of July; tree vigorous; shy in bearing so far; may be valuable on account of its late season.

Suda Hardy: Morello; ripened first week in July; fruit resembles English Morello; tree fairly productive; quality medium.

Windsor: Bigarreau; ripened 10th to 20th of July; trees are very vigorous and productive; on old trees not sprayed the fruit was a perfect failure from rot, but on young trees thoroughly sprayed with Bordeaux, the crop was very good; fruit large to very large, fine for eating fresh, but not a good cooking variety, because flesh remains tough and clings to the pit after cooking. Probably this variety has been too much boomed.

WOOD: Heart; ripened about 20th of June; trees in my old orchard now fifty years old, and beginning to die, yield about 40 quarts of good fruit per tree, with about as many more spoiling with constant wet weather, or stolen by the birds, which are yearly becoming more troublesome; very little rot on these trees, which were thoroughly sprayed; the finest early dessert cherry, and profitable for market; sold for 75 cents per eleven-quart basket.

WRAGG: Practically another name for English Morello.

NOTES BY A. E. SHERRINGTON (*Lake Huron Station*).

The fruit buds of the Duke and English varieties were all killed, hence no crop, but the Morello class yielded a good crop where the birds did not take them. The best varieties for the district are: Early Richmond, Montmorency, Ostheim, English Morello, ripening in order mentioned, but English Morello and Montmorency are the two most reliable varieties.

I cannot give any report as to yield, as so many were taken by the birds.

NOTES BY J. G. MITCHELL (*Georgian Bay Station*).

We had this season the finest crop of cherries in years, with such varieties as Windsor, Mary Duke, Ostheim, English Morello, Montmorency, Yellow Spanish, Early Richmond, Olivet, and the Common Red and Black.

These varieties are too well known to need description, and all of them are doing well, except Yellow Spanish, which is rather tender. Montmorency, Olivet and the Common Red and Black are the most profitable, and also the most reliable with us, in about the order named.

NOTES BY G. C. CASTON (*Simcoe Station*).

None of our cherries fruited this year. Some of them have not recovered from the effects of the winter of 1903-4, but no doubt the principal cause was the peculiar weather of last winter. For the first time in many years we had no snow, and the lack of this is a serious thing for the fruit here. The latter part of January the weather was unseasonably mild and open, so much so as to start the sap in most of the trees. Following close on this came the coldest week of the winter. Twice within a week the mercury went 24 degrees below zero. The result was injury to cherries and plums, both in roots and fruit buds; in fact, the fruit buds were so destroyed so that both cherries and plums were a failure this year. I would not advise planting the cherry for commercial purposes here at all. It would be a very uncertain business, and not at all likely to prove profitable. A few trees of the Morello class for home use is all I would recommend.

NOTES BY HAROLD JONES (*St. Lawrence Station*).

My report on cherries must be very brief, owing to the crop being a complete failure. There were a few blossoms on Orel, Ostheim, and Montmorency, but on examining them they were found to be all destroyed in the pistil.

Such varieties as Orel, Ostheim, Vladimir, Montmorency, Early Richmond, and E. Morello, are quite hardy here in wood, but the fruit bud suffers to such an extent that it is a very doubtful crop.

Notes by Chas. Young (*Algoma Fruit Station*).

With this fruit I can congratulate myself on being somewhat successful, the more so in that, when I first began with them, I had little hope of success. I do not mean to say that every year there is a full crop, but every year there is a fair crop of sour cherries. I had the impression, when I first planted, that the most suitable soil was that inclining to sand; I have since found this to be a mistake and have them growing on from light sandy loam, resting on a sand bottom, to stiff red clay, and, while avoiding either extremes, I have had decidedly the best success on rather stiff clay, having plenty of fall to carry the water off. My best trees, carrying the heaviest and surest crops, are on this soil, with a full northern exposure, and I may say having a full sweep of wind, clear across Lake Superior.

The varieties I would recommend are Early Richmond, Orel, Montmorency and English Morello. I can see no difference as regards hardiness. Ostheim has never produced a sufficiently full crop; it is a fair cherry to eat out of hand when fully ripe, but is no hardier than any of the others. At a distance of several miles from any large body of water, I find this fruit is not to be depended on. Whether it is absence of moisture or the effects of spring frost on the buds I am not prepared to say; perhaps both combined.

All the sweet cherries, without any exception, that I have tried, are not sufficiently hardy. The tree may live for several years, but I have had no fruit to speak of. I am now trying a few, headed so low that the snow will cover them over in winter. Late Duke and Elkhorn are, so far, sufficiently hardy.

CURRANTS.

Notes by A. W. Peart (*Burlington Station*).

Commercial List. *Red.* Cherry, North Star, Prince Albert, Victoria, Wilder. *Black*: Collin's Prolific, Naples, Saunders. *White*: Grape and Imperial.

Undesirable Varieties, not further described, but fully reported in 1904: Crandall, Belle de St. Giles, Brayly, Raby Castle, Red Dutch.

Following are descriptions and notes of varieties revised to date:—

Baldwin: Planted, 1903; fair grower; fruit, medium size; sub-acid, black; first and last ripe currants, July 20, Aug. 10; yield, one quart per bush (average of six).

Black Victoria: Planted, 1903; strong grower; fruit, large to very large; sub-acid; first and last ripe July 15, Aug. 5; yield per bush, 1 1-2 quarts.

Boskop's Giant: Planted, 1903; strong grower; berry, black; large to very large; acid to sub-acid; first and last ripe July 10-30; yield, one quart per bush.

Beauty: Planted, 1903; very strong grower; berry, black; medium to large; sub-acid; first and last ripe July 20, Aug. 10; yield, one quart per bush.

Champion: Planted, 1904; moderate grower; fruit, black; large to very large; sub-acid; first and last ripe July 25, Aug. 15; yield per bush, one quart.

COMET: Planted, 1903; moderate grower; fruit, red; acid; medium to large; first and last ripe, July 10-31; yield per bush, one quart.

CHERRY: An old standard variety that holds its own with newer varieties; fully described in report of 1905; yield this season per bush, three quarts; first and last ripe, July 5-31.

COLLINS' PROLIFIC: Planted, 1898; very strong grower; productive; berry, black; large to very large; sub-acid; first and last ripe, July 20, Aug. 10; yield per bush, three quarts.

FAY: Also an old standard variety, described in report, 1904; first and last ripe, July 10-30; yield per bush, two quarts.

LEE: Fully described in 1904: first and last ripe, July 20, Aug. 10; yield per bush, 1 1-2 quarts.

NAPLES: This old variety is scarcely superceded by the newer ones; average yield per bush, 3 1-3 quarts; first and last picking, July 20, Aug. 6.

NORTH STAR: Planted, 1896; strong grower; productive; fruit, medium to large; acid; first and last ripe, July 15, Aug. 5; yield per bush, average, two quarts.

PERFECTION: Planted, 1903; moderate grower; currant, medium to large; acid; red; first and last ripe, July 10-30; yield per bush, one quart.

POMONA: Planted, 1907; Moderate grower; fairly productive; red; medium to large; sub-acid to sweet; first and last ripe, July 10-30; yield per bush, three quarts.

PRINCE ALBERT: Planted, 1897; a strong and productive grower; very acid; first and last picking, July 15, Aug, 15; yield per bush, three quarts.

RED CROSS: Planted, 1896; strong grower; not very productive; fruit, red; medium to large; sub-acid; first and last ripe, July 10-30; yield, one quart per bush.

RED VICTORIA: Planted, 1896; bush very vigorous and productive; berry, medium; acid; first and last ripe, July 10-31; yield per bush, three quarts.

SAUNDERS: Planted, 1897; a strong productive grower; berry, black, large; sub-acid to sweet; first and last picking, July 20, Aug. 10; yield per bush, two quarts.

STANDARD: Planted, 1903; strong grower; fruit medium; black; sub-acid; first and last ripe, July 15, Aug. 5; yield, 1 1-2 quarts per bush.

SUCCESS: Planted, 1903; moderate grower; black; sub-acid; medium size; first and last ripe, July 12, Aug. 5; yield, one quart per bush.

VERSAILLES: Planted, 1896; moderate grower; not productive; berry, red, medium size, acid; first and last ripe, July 5-30; yield per bush, two quarts.

WHITE GRAPE and WHITE IMPERIAL: Fully described in previous reports; the former as the more productive, the latter of the finest quality.

WILDER: Planted, 1896; strong productive grower; currant, red, medium to large, sub-acid; first and last ripe, July 10, Aug. 5; average yield per bush, 2 1-2 quarts.

NOTE.—Currants generally were not so productive this year as the average.

Comparative yields of currants for years 1902-1906 inclusive, with average per bush per year:—

COMPARATIVE YIELDS of Currants for years 1902-1906 inclusive, with average per bush. per year.

	1902.	1903.	1904.	1905.	1906.	Five years.	Average per bush. per year.
	Quarts per bush.	Quarts per bush.	Quarts per bush.	Quarts per bush.	Quarts per bush.	Total.	
*Baldwin				1/4	1		
Belle d' St. Giles	2 1/2	1 1/2	1	1	2	8	1 3/5
*Black Victoria				1/2	1 1/2		
*Boskop's Giant				1/4	1		
†Brayley	3	4	2 1/2	4	2	15 1/2	3 1/10
*Beauty				1/2	1		
Champion	3	4	2	3	2	14	2 4/5
*Comet				1/2	1		
Cherry	4 1/2	5 1/2	4	5	3	22	4 2/5
Collins	2 1/2	5 1/2	4	4	3	19	3 4/5
Crandall	4	4 1/2	5 1/2	4	3	21	4 1/5
Fay	3 1/2	4	2 1/2	3 1/2	1 1/2	15	3
Lee	3	4	2 1/2	3	1 1/2	14	2 4/5
Naples	3	4 1/2	3	4	3 1/2	18	3 3/5
New Victoria	4 1/2	5	5	5	3	22 1/2	4 2/5
North Star	4 1/2	5 1/2	2 1/2	4	2	18 1/2	*3 3/5
*Perfection				1/2	1		
Pomona	4 1/2	4	3 1/4	4	3	18 3/4	*3 3/5
Prince Albert	4	4 1/2	4	5	3	20 1/2	*4
†Raby Castle	5	6	4	5	3	23	4 3/5
Red Cross	4	4 1/2	3 1/4	2	1	14 3/4	*2 4/5
†Red Dutch	6 1/2	7 1/2	4	3 1/2	2	23 1/2	*4 2/5
Red Victoria	6	7	5	5	3	26	5 1/5
Saunders	3	5	4	4	2	18	3 3/5
*Standard				1/2	1 1/2		
*Success				1/4	1		
Versailles	3	4	3	2 1/2	2	14 1/2	*2 4/5
White Grape	4	5	2 1/2	3	2	16 1/2	*3 1/5
White Imperial	3	4	1 1/2	1 1/2	1	11	2 1/5
Wilder	4	5 1/2	4	5	2 1/2	21	4 1/5

* Planted recently.
† Rather small, and therefore discarded, yet they give a heavy yield.

NOTES BY HAROLD JONES (*St. Lawrence Station*).

CHERRY, RABY CASTLE, and VICTORIA, in reds have given the best results.

FAYS is disappointing in both wood and bunch.

POMONA has not shown any special feature of merit, and is not holding its own with the three varieties mentioned above.

PRINCE ALBERT is a strong, vigorous bush, with an abundance of foliage, but the fruit is too late in ripening and is very acid.

WHITE GRAPE gives good results, and is a desirable and valuable currant.

VICTORIA (Black), is very large in fruit, but does not give as good crops as Lees Prolific.

NOTES BY CHAS. YOUNG (*Algoma Station*).

This is a fruit that never fails here. Our climate and soil seems perfectly adapted to it. An old experienced grower from the east, in looking

over the experimental plot this fall, made the observation that I had left more fruit on the bushes after picking than what they would consider a full crop. Be that as it may, it is a crop that never fails; plenty of stable manure, shallow cultivation, cutting out all wood over three years old, meets all the requirements. I have very little choice of varieties. In some, the individual berries are larger, but the gross yield is no better. Versailles red and Champion black are perhaps as good as any; White Grape is not saleable here. No disease or insect troubles them, but what can be easily controlled with Paris green or hellebore. After strawberries this is the best paying crop I can grow, and the supply is not nearly equal to the demand. Taking into consideration the small amount of labor required and the certainty of a crop, currants have always been satisfactory.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

Currants were a fair crop, about equal with last year, in fact, to the box. In reds, the favorites are Red Cross, Fays, Prince Albert and Cherry; in blacks, Champion and Naples; in whites, White Grape, Wilder, and other varieties which have not fruited sufficiently yet for me to say much about them. A few new varieties, such as Perfection, were planted last spring; in all, I have about eighteen varieties.

CHERRY: Bush of spreading habit, not as strong as Fays or Red Cross; fruit, large; color, red; quality, good; yield per bush., 83 oz.; ripe July 18th.

CHAMPION: Bush strong, vigorous and hardy; fruit, large; color, black; quality, best; yield, 63 oz. per bush; ripe, July 18th; one of the best.

CHAMPION: Bush, strong, vigorous and hardy; fruit, very large; color, red; quality, good; yield, 97 oz. per bush; ripe, July 18th.

NORTH STAR: Bush, rather small canes and weak, hardy; fruit, small; color, red; quality, poor; yield, 68 oz.; ripe, July 30th.

NAPLES: Bush, strong and vigorous, hardy and healthy; fruit, large, black; quality, good, yield, 66 oz.; ripe, July 18th.

POMONA: Bush, a rather poor grower, not as vigorous as it might be; fruit, medium to large; color, red; quality, best; yield, 83 oz.; ripe, July 10th.

PRINCE ALBERT: Bush, strong and vigorous, with handsome foliage, healthy and hardy; fruit large, red; quality, good; yield, 112 oz.; ripe, July 30th.

RED CROSS: Bush, a strong, vigorous grower and hardy; fruit, large; color, red; quality, best; yield, 63 oz.; ripe, July 20th.

RABY CASTLE: An old variety, but good in its place; a heavy cropper; bush, strong and vigorous, very hardy; fruit, small; color, red; quality, rather acid; a late variety; hangs on the bush well; yield, 78 oz.; ripe, July 30th.

WHITE GRAPE: Bush, strong, upright grower; fruit, medium to large; color, white; quality, good; yield, 50 oz.; ripe, July 15th; the best white Currant.

GOOSEBERRIES.

NOTES BY HAROLD JONES, (*St. Lawrence Station*).

DOWNING maintains its character for prolific bearing and perfect freedom from disease, but the fruit is rather small for ready sale.

Golden Prolific, planted 1905, gave a scattered crop of large, handsome berries, and as the bush seems free from disease it gives promise of being of value.

Champion, planted 1905, gave a good crop of fruit, but the size was no better than Downing, with more small berries. However, the fruit hung in clusters in a way that made harvesting very easy and rapid, and it may prove of value on further trial.

Notes by Chas. Young, (*Algoma Station*).

These have always been satisfactory, and, although not as sure a crop as currants, in no year have they failed to make a satisfactory return for the attention they received. I have fourteen varieties under test. Our old berry, the Houghton, bears heavily, but is too small. Downing is better in regard to size, but no better in quality. Pearl has fewer small berries than the former, and looks on that account better in the basket, but smaller in regard to yield. The English berries, although larger, with me are not so profitable, nor do I consider the quality as a rule as good; they are mostly thick and tough in the skin, and do not make as fine a quality of preserves as the Downing or Pearl. Sometimes an individual bush will give an extraordinary crop, but they cannot be depended upon like the American varieties. The best may be Industry. Red Jacket produces well, but the bushes are small yet. I have not seen a mildewed berry for years, and I take no special precaution to prevent it. The local price keeps always the same, 10c. a box. The same cultivation as for currants is all they require. I would hesitate to put plow between the rows, or use any tool that would go deeper than a horse cultivator. I do not approve of the system of growing from a single stem; it has many disadvantages and nothing to recommend it, unless, perhaps, a little easier to get at the berries.

Notes by A. E. Sherrington, (*Lake Huron Station*).

The gooseberry crop was about one-third less than last year, but the quality was good. The demand for this fruit is steadily growing, prices for the last few years have been quite satisfactory; the chief varieties grown are Downing and Pearl; ten varieties are now under test; a number of the new have not fruited yet, except a very few berries not worth recording.

Downing: Bush, strong and vigorous, hardy; fruit, medium to large; color, green; quality, good; yield, three quarts per bush.

Pearl: Bush resembles Downing in every respect; fruit also, cannot see any difference; yield, three and two-third quarts.

Crown Bob: Whitesmith; yield a few berries, but of so small quantity that it was not worth noting.

Red Jacket: Bush, strong, vigorous, hardy, of spreading habit; fruit, large; color, red when ripe; quality, good; a profitable variety; yield, per bush., four quarts.

GRAPES.

Notes by M. Pettit, (*Wentworth Station*).

Another year's experience with the varieties of grapes grown at this station proves that the list for profit already given is still correct.

Agawam (Rog. No. 15) has been the most profitable this year. Closely following are Delaware, Catawba, and Niagara. The next for profit have been Campbell's Early, Champion, Concord, Lindley, and Worden; then Wilder, Moore's Early, and Moore's Diamond.

Wet weather, during the last of June and the first week in July, caused an unusual form of fungus; the grapes when quite small turned a pale color, dried up and dropped out, leaving the clusters thin and unshapely. Niagara and some of the Rogers suffered most. Later, the foliage, on unsprayed vines, became very weak, and a considerable quantity of it dropped off. Vineyards that were sprayed with the Bordeaux mixture before they bloomed were entirely free from this trouble; those sprayed every ten days after it appeared were in fair condition, but it was clearly shown that one spraying before blooming was of more value than three or four times after the fungus appeared. With a good cart spraying outfit, one man, with one horse, will spray eight or ten acres a day, which will add in most seasons from 10 to 50 per cent. to the value of the crop.

All the varieties I have in cultivation have been fully described in previous reports, and their productiveness this year does not justify making any changes in those reports.

The first 100 baskets of Champion was gathered this year on Aug. 28th and sold at 30c. per basket.

Campbell's Early, on Sept. 3rd, sold at 35c. per basket.

Moore's Early, on Sept. 3rd, sold at 28c. per basket.

Red Rogers, on Sept. 6th, sold at 30c. per basket.

Niagara, on Sept. 11th, sold at 25c. per basket.

Worden, on Sept. 12th, sold at 20c. per basket.

Delaware, on Sept. 15th, sold at 30c. per basket.

Concord, on Sept. 19th, sold at 17c. per basket.

Agawam and Catawba were sold, on Oct. 20th, at 22c. per basket for car load.

By J. L. Hilborn, (*South-western Station*).

There are very few grapes grown here for market purposes, except on Pelee Island, and the acreage there is small since the winter of 1899 when many of the vineyards were frozen out.

Nearly all varieties of grapes do well here, and I am satisfied that grape growing, especially of the early varieties, and properly handled, would prove very remunerative.

Practically no pears, and not many apples, are grown for shipping purposes lately. Most of the apples are either canned or evaporated.

PEACHES.

Notes by L. Woolverton, Grimsby, Ont.

Beer's Smock: This peach impressed me favorably as being larger and more attractive than Smock, though perhaps not quite so late in season. It ripened during the first week in October. The fruit is yellow, with red cheek; the flesh yellow, tender and juicy and of a good flavor.

Carlisle: Quite a different peach from the one grown under that name about St. Catharines, which is a yellow flesh and ripe in September. This

is a large, white flesh peach, with greenish, white skin, not showy in appearance, but quite large in size, and hangs on the tree until the 20th of October, or even later.

CHAMPION: This was in season early in September, coming in with the last of the Yellow St. John. It was one of the most productive varieties in the orchard and has been ever since the trees came into bearing. The color is yellowish white, with red cheek, and the flesh whitish; the flavor is delicious. I would highly commend this peach for the home garden. I am not prepared to pass judgment upon it for market purposes, because it competes with the Yellow St. John.

CROSBY: Season, middle to last of September, after the Early Crawford is well out of the market. The fruit is medium in size, yellow fleshed, and firm enough to be a good shipper. The tree is vigorous and productive.

EARLY CRAWFORD: This old variety still holds the first place as the best all round peach grown in Ontario. The fruit buds do not seem to be quite as hardy as some other kinds, but in favorable localities the tree is quite productive. The fruit is magnificent, being very large, of beautiful golden color, with a rich crimson cheek. There are several other peaches competing with it, such as Garfield, Fitzgerald, Millionaire, New Prolific, Reeves, Wonderful, etc., but if Early Crawford were the novelty, we believe it would create a tremendous boom in the face of them all.

ELBERTA: This peach is coming to the front in Ontario as a leading commercial variety, and is being planted by the thousand: perhaps it is being over-planted, like many other favorites. During the past season Elberta excelled itself. The trees were vigorous and healthy, without a sign of curl leaf, to which many claimed they were subject, and they bore prodigious crops. The fruit was immense in size, notwithstanding the quantity; and there were no small ones to cull out. The shipping quality of this peach is one of its points of merit. We are hoping to be able to export it to Great Britain with success next season.

FITZGERALD: Of the Crawford type; excellent in quality; an excellent market peach; by some counted more profitable than Early Crawford.

FOSTER: Another of the Early Crawford type; of tender flesh; by some considered superior to the latter in quality, and consequently especially desirable for home uses.

GREENSBORO: Of about the same season as Alexander, but larger and rather more desirable for home uses. 1st picking, August 6th; fruit was rather acid, but good cut up with cream; not very attractive; too tender for distant shipments.

HYNES: The very nicest little peach for dessert, beautiful in color and delicious in flavor, flesh tender and juicy, semi-free: should never be omitted from the home garden, and shows up beautifully in the shipping basket.

JACQUES RARERIPE: A fine peach of the Early Crawford type, and nearly the same in season.

LATE CRAWFORD: Inferior to Early Crawford; tree not very productive; drops fruit early.

LEWIS: A beautiful, large, round, white fleshed peach with rich crimson well covering the skin; of the best quality for eating; tree very productive; season, about middle of August; a valuable market variety.

LONGHURST: A magnificent canning peach; small and unprofitable where not thinned or uncultivated; but where well grown, large and fine, and very profitable; fruit buds more hardy than some other kinds; season, last of September.

Mountain Rose: A delicious dessert peach which should be in every garden; creamy white in color, tinged with red; flesh white, juicy, free.

New Prolific: Of the Early Crawford type, but on my grounds rather more productive; season, early September; I believe it well worthy of a large place in the commercial orchard.

Old Mixon: This old and excellent white-fleshed variety is superseded for market purposes by the numerous excellent yellow flesh varieties of the same season. It closely follows the Early Crawford in season.

Reeves: Of Early Crawford type, ripening middle of September; the tree is very vigorous, but lacks in productiveness.

Rivers: An early variety, which was at first liberally planted in our commercial orchards, but now discarded because of its tender flesh which shows the slightest bruise. The color of skin or flesh is creamy white.

Saint John: A very popular market peach, closely resembling Early Crawford, but ripening a week earlier; about the earliest really valuable peach for the commercial orchard.

Smock: A splendid late market peach when the season is favorable for its ripening and coloring. This year, in many orchards, it was lacking in color; season, first week in October.

Sneed: This variety was very satisfactory with me this season, ripening the 22nd of June, and yielding wonderfully well; it was a poor shipper, but it had no Canadian-grown competitor. I picked the last about August 1st; the fruit is white fleshed, and very tender.

Triumph: Where well thinned, large, fine and highly colored, with deep red and yellow ground; a good shipper; a semi-cling, and very variable; the tree is subject to twig blight, and should not be planted too freely.

Wonderful: Of Early Crawford type, but later in season; fruit large, golden yellow and very beautiful, but the tree is lacking in productiveness.

New Seedlings are constantly showing up. Mr. A. Rutherford, of Grimsby, had in his orchard four trees of a remarkably large and fine yellow fleshed peach, later than Elberta; and Mr. Beverly Book has been showing another, still larger, a free stone, of excellent quality, ripening just in advance of the Smock.

The Smithson, a fine peach of the Early Crawford type, originating near Grimsby, has been planted to a considerable extent about Grimsby.

The Wellington, a new yellow flesh peach, also late in maturity, is being offered for sale in the Niagara district. The fruit was very favorably noted by our Fruit Committee some years ago, and if the tree is productive the variety is valuable.

These varieties should be propagated and tested for us at our new Fruit Station near Jordan, as quickly as possible.

By J. L. Hilborn (*South-western Station*).

The very serious loss of peach trees by the February freeze in 1899, and again in February, 1904, almost totally destroyed the peach orchards in this district, and since the latter date the plantings of this fruit have been much lighter than for a few years previously.

Many growers were more or less discouraged with peach growing, and turned their attention to other crops. This is the chief cause of such an increased quantity of tobacco being grown here the last few years, one hundred and fifty cars being shipped from Leamington the past season.

The growing of early tomatoes and other vegetables has also increased to a great extent, largely due to the loss of the peach orchards.

However, quite a number began planting at once, and have continued planting each season. A noticeable increase in the yearly planting is very evident, and, as the trees grow very rapidly here, Essex County will soon be sending a lot of peaches to market unless a calamity occurs again.

What is called the peach land here is of a peculiar nature, and appears to contain a large amount of mineral deposit which has the effect of causing it to warm up to a high temperature with the summer sun, and, if properly handled, we can get excellent early crops of vegetables, etc., and a great tree growth.

This same peculiarity causes it to freeze very readily and very hard, and as it is a very dry soil and we get very little snow as a rule, the frost penetrates deeply when we get a severe winter and destroys the roots of the trees. Judging from past experience, one is compelled to consider peach growing is somewhat of a lottery unless some means can be devised to prevent the roots of the trees from being destroyed when we get a severe winter.

As previously stated, there are not many peach trees in bearing here yet. However, we had a few old trees and some young ones that were bearing the past summer, and found the different varieties to behave much the same as in our former orchards. Following are dates of ripening of the few varieties that fruited this season; I expect to have more varieties in bearing hereafter.

Triumph was gathered from August 8th to August 14th. This variety does very well on young trees, but runs small and rots badly as the tree becomes older; it is therefore disappointing.

Admiral Dewey is about the same season, is somewhat larger, a better color, does not cling much to the pit; and is much more satisfactory, but it also rots quite badly in older trees.

Barnard ripened from Sept. 1st to 7th. is excellent quality, but too small to take well in the market.

Brigden ripened Sept. 6th to 13th; an excellent variety.

Engol Mammoth follows this variety very closely, and while it is not so large or showy, it is of good size and quality, and an excellent bearer, and I know of no better variety to grow.

New Prolific was harvested Sept. 12th to 18th; also an excellent variety.

Elberta was gathered Sept. 14th to 20th, did not do so well this season with me as it does sometimes; I think this variety is being overplanted.

Kalamazoo, Sept. 20th to 25th.

Banner, Sept. 24th to Oct. 4th, another excellent variety, but is sometimes small on young trees.

Golden Drop, Sept. 29th to Oct. 8th; a profitable variety if properly pruned and thinned, otherwise too small.

Lemon Free, Oct. 2nd to 9th.

I have fruited many other varieties in former years, and consider the following among the best varieties for this section of those I have tested: Brigden, Engol Mammoth, New Prolific, Elberta, Kalamazoo, Banner, Golden Drop.

Our soil is too light for the Crawfords to do well, therefore they have been but little planted of late.

Winter Protection of the Peach Tree.

In this immediate vicinity peach growing is attracting much more attention than all other fruits, and if some means can be devised to prevent

the roots of the trees from freezing so severely during severe winters I think peaches could be produced here as good and at as great a profit as in any locality with which I am acquainted.

Cover Crops are an excellent help in any orchard, and I have always sown all peach orchards with something calculated for cover crop ever since I have been trying to grow peaches.

I have tried everything recommended for this purpose, but the last few years have now settled on what I now consider is best suited for my purpose.

For young orchards, until they come into bearing, I sow Yellow Aberdeen turnips broadcast and harrow in. I like to have the orchard thoroughly cultivated up to the time of sowing, 12th to 20th of July.

In a bearing orchard, I like to cultivate to about Sept. 1st, then sow to oats rather thickly.

While cover crops are all right in an orchard, no cover crop that can be grown here will save the trees through such winters as those of 1899 and 1904, for the simple reason that directly around and under the trees is where we are most in need of protection, and it is impossible to get a growth of anything under a bearing peach tree at this season in this dry soil.

After losing two as fine peach orchards as I ever saw, I resolved not to give up in despair like many others, which may prove to be the best way, but to endeavor to learn by what means I could save my trees in future should we again be visited by such conditions as we have experienced.

When pulling out my 5,000 dead trees after my first loss, and again five years later when pulling out about 3,500, I examined a large number of trees and found that many of them appeared to have the greater portion of their roots still alive but the bark at the base of the tree trunk was completely killed just above the roots and this convinced me that the sand freezing so hard as it evidently did against this rather soft bark was responsible for much of the damage, and that this point must also be protected; therefore the next fall and every fall since we have protected every peach tree on our farm.

We first remove the soil at the base of each tree, and, if any Borers are present, dig them out. Then each tree is wrapped with building paper or veneer. The last two seasons I have used veneer for nearly all. Each tree is then mulched with litter of some sort, mostly old straw, procured wherever we can get the remnant of an old strawstack. Tomato vines and clover chaff have also been used to some extent. This is left under the trees, and the next season more is added if necessary. While this would appear to be a great deal of labor, and to take a lot of material, we do not find it very expensive, or to take nearly as much material as I at first imagined it would require.

The fact of this space beneath the tree being covered with this mulch is, I think, good for the tree, and saves considerable in the cultivation of the orchard.

We are still experimenting with different methods and material for this protection, but as we have not had a severe freeze since we have been giving protection, all trees have wintered well whether protected or not.

I am not anxious for another such winter as those that destroyed our other orchards to test the value of these different methods of protection, but if such should come, I think this may save our trees. However, I intend to continue to practice this system every season until something happens to convince me otherwise. There is still room for much experimental work along this line.

As previously stated, peach growing appears to be the all interesting fruit subject at present, and it would appear to me that the most important point of all is to discover some method if possible to grow orchards that would survive our precarious winters.

As the question of varieties is a very important one, and so many new varieties are being yearly introduced, if those that are likely to prove valuable could be tested, no doubt much valuable information could be gained, and much money saved the average grower who now has to do his own testing or plant the old varieties that have been tested. I have been planting several varieties not much grown in Canada that are likely to prove valuable, and am well aware that many new varieties now being offered are likely to prove valuable, especially if some of them prove to be capable of withstanding long shipments better than some of the older and otherwise good varieties.

NOTES BY W. W. HILBORN (*South-western Station.*)

The experimental plot of peach trees planted in the spring of 1904 has made a good growth this season. The trees came through the past winter in perfect condition. The ground among them had been sown to rye the previous autumn, which made a good covering during winter, and when plowed under in the spring adds humus to the soil. In the autumn every tree was banked up with a mound of soil twelve to fifteen inches high; this was removed in early spring. Early tomatoes were planted this season among the trees. When the crop was gathered the plants were pulled up and placed around the trees, and enough coarse manure added to make a good mulch for root protection during the winter, and the ground again sown to rye.

PEACH CULTURE. The cultivation of the peach in this locality had reached large proportions previous to the freeze-out during the winter of 1899. One thousand acres devoted to this fruit could be seen from our farm. Ninety per cent. of the trees were killed by root-freezing at the above date. Considerable replanting was done, and four years later another freeze-out occurred equally as severe as the first. Since that time there have not been many large orchards planted on account of the danger from root-freezing. Those that have been planted are doing well, and quite a number of growers are resorting to some method of root protection. The only danger from root-freezing is when we have a long period of continued freezing without snow or other covering on the ground. Frost sometimes penetrates four or five feet deep in our sandy soil, or below the roots of the trees, and when this occurs it is death to them. It is hoped that winter-killing may be prevented by the above method of mulching.

In planting an orchard, I prefer No. 1 one year old trees, and planted in spring just when growth begins. Head back to 2 or 2½ feet high; subsequent pruning should be done every spring after hard freezing weather is past. Cut back the past season's growth one-quarter to one-half, and thin out the head of the tree to give sufficient circulation of air and admit plenty of sunlight. During the first two seasons some early hoed crop may be grown among the trees. In August, or as soon as the crop is harvested, sow to some cover crop such as rye, crimson clover, turnips or rape.

VARIETIES. It is of the greatest importance to make a proper selection of varieties for a commercial orchard. Our customers want peaches regularly during the whole season, and one sort lasts but a few days, hence the necessity of selecting those kinds that will not only give a succession, but will produce fruit of the best quality. Everybody wants Crawford peaches, therefore we should select as far as possible of that type. The following varieties have proved very satisfactory with me, and are named in their order

of ripening; they cover the whole season: Alexander, Greensboro (white flesh), St. John, Garfield, Early Crawford, Fitzgerald, Prolific, Engol Mammoth, Elberta, Golden Drop, Bronson, Kalamazoo, Smock, and Banner (yellow flesh).

Notes by A. E. Sherrington, (*Lake Huron Station*).

All the peach trees planted before the hard winters of two years ago were killed out; the young trees planted since are doing well, but have not fruited yet. It is doubtful if ever we will have a peach that will be hardy enough to be successful here; it is no trouble to grow the trees, but the buds winter kill.

PEARS.

Notes by M. Pettit (*Wentworth Station*).

Giffard was one of the most profitable this season; the crop was heavy, free from scab and sold at good prices.

Bartletts were a very fine sample and in good demand.

Flemish Beauty, medium sample with considerable fungus.

Anjou, a heavy crop and fine sample.

Duchess, a heavy crop; not so large as usual; they were shipped to Cape Town, South Africa, at a good price.

Kiefer, a full crop; not as large as usual; in good demand for canning at 1¼c. per lb.

Pear Blight has been very destructive at this station and throughout this district during the summers of 1904, 1905 and 1906; the two first summers all blighted branches were cut out below any appearance of blight and taken out of the orchard. Even with this precaution, 25 Clapp's Favorite, planted 16 years, are entirely destroyed; of 100 Flemish Beauty planted over 20 years 48 were entirely destroyed, and all of the rest partially gone. Bartlett, of 170 planted about 20 years, 68 are entirely destroyed, 55 partly gone and not one left entirely free from blight. Piffard, of 520 from 12 to 20 years planted, 27 are entirely gone, about 50 slightly damaged, balance healthy. Kieffer, of 1,500 planted 13 years, 22 are entirely destroyed, about 50 slightly damaged, balance healthy. Duchess Dwarf, of 300 planted over 20 years, some were slightly damaged during the past summer.

All of the varieties mentioned have had continued cultivation.

San Jose Scale was found by the Inspector on two trees in the experimental orchard; one of them was cut down and burned, the other thoroughly sprayed with the lime and sulphur mixture, also all other trees in that orchard. A careful inspection was made by the Inspector during the summer and no scale was found.

Codling Moth has been much more destructive than in previous years, both in apples and pears. Swift's arsenite of lead and white arsenic were both used with Bordeaux, and showed a little in favor of the arsenite of lead.

Notes by Harold Jones (*St. Lawrence Station*).

Of the forty varieties of pears planted in 1896-97-98, only five have lived through the severe winters of 1903 and 1904. The injury was not due to root-killing, but they died down to the root. Those alive are:

Bessemianka: Planted 1896; a vigorous, close, round head; hardy; fruits nearly every year, but fruit of no value, rotting at the core before maturity.

Clapp's Favorite: Planted 1896; an upright, vigorous tree; shows some injury from frost; fruit buds tender, only bearing in favorable seasons.

Flemish Beauty: Planted 1896; an upright, compact tree, hardy; bears fruit nearly every year; the most desirable to plant of all varieties yet tested.

Ritson: Planted 1896; fairly hardy, but shows injury in severe years; fruit bud tender; only a scattered crop in favorable years.

Victoria: A hardy iron-clad of Russian origin, but fruit of no value.

Notes by J. G. Mitchell, (*Georgian Bay Station*).

We again have had a fine crop of pears. Such varieties as Anjou, Bartlett, Seckel, Duchess, Howell, Clapp's Favorite, Beurre Clairgeau Bartlett, Seckel, and Flemish Beauty, carried fine crops, all that could be desired. These are the well tried varieties, and succeed as well as apples.

We have quite a large number of varieties which have not fruited yet. Among these there is an importation direct from France. Some of them are very promising, while others are doing rather poorly. However, enough has been done along this line to show that pears of the best quality and also of the best varieties are grown quite as successfully in this district as any other fruit.

Notes by A. E. Sherrington, (*Lake Huron Station*).

The young pear trees are doing very well now, but quite a number were lost by the frost two years ago, and had to be replaced or grafted over; a few trees were lost this season by the blight; very few have fruited as yet, none worth reporting on; quite a number of Kieffer trees has been planted for top grafting. Those that have been been grafted are making a vigorous growth, and I believe will make satisfactory orchard trees.

Notes by G. C. Caston (*Simcoe Station*).

I have been top working a number of pears on Flemish Beauty and Russian stock, with a fair measure of success. Although the winter of 1903-4 was very hard on them, Bartlett has done the best so far, top worked on hardy stock. But I have in the orchard a block of trees of Clapp's Favorite, that are quite healthy and thrifty, and are just beginning to bear.

Flemish Beauty is quite hardy here, and is a long lived tree; but most years it is entirely worthless for fungus scab, as few people take the trouble to spray sufficiently to keep the fruit clean.

Notes by Chas. Young, (*Algoma Station*).

Up until the winter of 1903-4 this fruit did fairly well, that is, one might grow a few for home use; but for commercial purposes they have been, and I am satisfied will be, a failure unless we can get something different from what we have. As it is, there have been no pears here this year except some Russians, which we would be better without. With the exception of Kieffer, none were entirely killed in the spring of 1904; the roots and part of the trunk were alive and sent out strong, sappy shoots which in most cases were again frozen the following winter. Anjou is not considered very hardy, but it has stood the winter better than most of the others; Idaho perhaps next, followed by Flemish Beauty and Goodale. Out of twenty planted in 1900, only five remain with the original top, and they are not promising.

PLUMS.

Notes by W. T. Macoun, Ottawa, on Hardy Plums.

Each year's experience strengthens our conviction that for Eastern Ontario and for all Ontario north of latitude 45°, and in some places south of that, the main dependence for the present must be on the Americana and Nigra plums. As seedlings of the Domestica or European plums, are raised and fruited at their northern limit, there will, we feel sure, eventually be produced varieties of this class of plum which will extend its culture northward, but at present we have no plums of this class that can be grown in the northern parts of Ontario that will prove profitable if grown commercially. The seedling European plums originated on the Island of Montreal appear decidedly hardier than most of the named sorts. As these have not been described, as far as we know, in the reports of the Ontario Fruit Experiment Stations, the following descriptions are given of the four most promising varieties, namely, the Mount Royal, Raynes, Lunn, and Mountain:

Mount Royal (Dunlop 54): Fruit received from W. W. Dunlop, Outremont, Que. Fruit roundish, flattened at stem end; size medium; cavity medium to open, medium depth, somewhat flaring; stem short to medium, moderately stout; suture distinct, very slightly depressed; apex rounded, slightly flattened; colour dark purple; dots numerous, irregular, distinct; bloom blue, moderate; skin moderately thick, moderately tender; flesh greenish yellow, juicy, firm; stone below medium, roundish cling; flavour sweet, moderately rich; quality good; season early to mid September. Should be a good shipping plum.

Raynes (Dunlop 53): Fruit received from W. W. Dunlop, Outremont, Que. Form oval, long, flattened on side of suture; size above medium to large; cavity medium depth and width, abrupt; stem medium length, moderately stout; suture distinct, slightly depressed; apex rounded; colour dark reddish purple; dots small, numerous, indistinct; bloom moderate, blue; skin thin, tender; flesh, yellowish green, firm, fairly juicy; stone above medium to large, long, oval, free; moderately sweet; quality above medium; season early to middle of September. A prolific bearer and should be a good shipper. A prune plum.

Lunn (Montreal, No 60): Fruit received from W. W. Dunlop, Outremont, Que. Form oval, broad (round oval); size large; cavity shallow, medium width, slightly flaring; stem medium length, ½ inch stout; suture a distinct line, very little if any depression; apex rounded, very slightly flattened; colour dark purple; dots fairly numerous, irregular, indistinct, brownish; bloom moderate; blue; skin, moderately thick, tough; flesh yellowish green, very juicy, fairly firm; stone large, oval, cling; sweet, rich; quality very good. Season early to middle of September. A fine dessert plum.

Mountain: Fruit received from W. W. Dunlop, Outremont, Que. Form roundish, flattened slightly at ends; size medium to above; cavity medium depth and width, slightly flaring; stem medium to long, moderately stout, suture distinct, usually slightly depressed; apex slightly flattened, colour, greenish yellow, more or less overspread with dull coppery red; dots numerous, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh yellowish green; stone above medium, broad, roundish, cling; sweet,

rich; quality very good; season early to middle September. An excellent dessert plum. Well worth propagation.

The variety known as Lachine is also a profitable kind to grow. It resembles the Yellow Egg somewhat. These varieties are not yet offered for sale by nurserymen, but they should be propagated as soon as possible, as they are valuable.

In addition to these Montreal seedlings, the hardiest kinds at Ottawa have been the Richland, Early Red Russian and Ungarish, which kinds have at times produced good crops. The Glass seedling is as hardy and healthy a tree as any European plum that has been tested, if not more so, but it has proved tender in the fruit bud, more so than the Early Red, which is not as vigorous a tree. The Perdrigon is a red European plum, introduced from France by the Trappist Fathers at Oka, Que., which has proved hardier than most kinds there. This has not fruited yet at Ottawa, but we have tested the fruit and find it of very good quality. The following description was made of it:

Perdrigon: Form oval, flattened on one side; size large; cavity narrow, medium depth, abrupt; stem short to medium, stout; suture a distinct line, no depression; apex rounded; colour deep yellow, more or less overspread with red; dots numerous, distinct; bloom, moderate, pinkish; skin moderately thick, moderately tender; flesh yellow, moderately firm, juicy; stone large, oval, rough, free; flavor sweet and rich. Quality very good. Season early to mid September. A handsome dessert plum.

The following descriptions are given of the Early Red, Richland, and Ungarish:

Early Red: Form oval; medium size; cavity narrow, shallow, abrupt; stem medium length, slender; suture an indistinct line, no depression; apex rounded; colour dull purplish red; dots moderately numerous, yellow, distinct; bloom thin, blue; skin fairly thick, moderately tender; flesh yellowish green, juicy; stone medium size, long, oval, cling; moderately sweet with an acid aftertaste; quality medium. Season, late September. Of the Lombard type. Imported from Russia by Prof. Budd from Dr. Regel, St. Petersburg, during the winter of 1881-2. Prof Budd writing in 1890 said of this plum, 'This was sent out quite extensively eight years ago marked 'mixed Arab.' The sorts mixed were Early Red, White Nicholas and Black Arab,' most of the trees proved to be Early Red Russian No. 3.

Richland: Form oval; size medium to above; cavity narrow, medium depth, abrupt; stem medium length, $\frac{3}{4}$-inch, slender; suture a distinct line, no depression; apex rounded; colour deep purplish red; dots fairly numerous, yellow, indistinct; bloom moderate, blue; skin thick, fairly tender; flesh greenish yellow, juicy, moderately firm; stone medium size, oval, flat, cling; sweet but not rich; quality above medium. Season, middle of September. Hardier than most European sorts. Originated on the farm of Randall Elden, Richland, Pennsylvania.

Ungarish: Form long, oval; size above medium to large; cavity narrow, shallow, abrupt; suture distinct, very slightly if at all depressed; apex round; colour dark purple; dots moderately numerous, indistinct, brown; bloom moderate, blue; skin fairly thick, tender; flesh greenish yellow, firm, fairly juicy; stone large, long, oval, free; moderately sweet; quality above medium; season, middle of September. Introduced by Prof. Budd from C. H. Wagner, Riga, Russia.

This plum is somewhat like the Raynes (Dunlops, 53). A prune plum, promising on account of hardiness.

None of the Japanese plums have proved hardy at Ottawa, although there have been a few specimens of Red June. Seeds of these were sowed, and from these have been produced the Togo and Oyama, two seedlings which evidently have Americana blood, although they resemble the Japanese in most particulars. Both of these varieties are hardier in fruit bud than any of the Japanese yet tested and both of them are quite promising. Quite a number of hybrid varieties with Japanese and Americana blood procured from the United States are being tested, but none of these have fruited. Good crops of Americana and Nigra plums are obtained every year at Ottawa, and some of the best varieties are not to be despised. Canadian nurserymen seem slow to propagate the earlier varieties, those usually advertised being among the latest. A good selection to cover the season is Odegard, Aitkin, Bixby, Mankato, Cheney, Wolf, Hawkeye, Stoddard, Bouncer, Admiral Schley, and Aren, and two very good varieties of more recent introduction. Cottrell is one of the best for eating out of hand.

A number of seedlings originated at the Central Experimental Farm have been named as they are considered very promising. These are Bouncer, Don, Caro, Consul, Sunrise, Welcome, Kilmore, Swift, Gloria, Fitzroy. Seedlings of these are being grown, some of which should fruit next year. What is aimed at is to obtain a large plum, with a thick skin, without astringency and having a freestone. The flavor of many kinds is very good. Nearly all these points have been obtained among sound varieties, and what is desired is to unite them in one.

Notes by J. L. Hilborn, (*South-Western Station*).

Plums are but little grown here, and this season were almost an entire failure, except in our own orchard. We have about 200 trees of Burbank which produced a good crop of excellent quality which sold readily.

Two thorough sprayings were given with Bordeaux mixture, which we thought did much towards the success of this crop.

Notes by M. Pettit, (*Wentworth Station*).

The plum crop at this station was an entire failure. The buds of the Japan varieties were destroyed by winter killing, having started during the warm weather in January. Other kinds were destroyed by spraying with soda Bordeaux; that is, sal soda in place of lime in Bordeaux mixture. This was used during the spring of 1905, and killed this season's fruit buds.

Notes by J. G. Mitchell, (*Georgian Bay Station*).

I regret to say that there is nothing new to add to last report on plums. There were no plums on the Station grounds or in the district to amount to anything, and just why they failed it would be very hard to say.

There was a magnificent crop of cherries, and all bloom about the same time.

Peaches were also a failure, only a few stray fruits to be found.

Notes by A. E. Sherrington, (*Lake Huron Station*).

The crop, as stated in general notes, was a total failure, some trees being killed straight by having the buds frozen; others sent out but a very small crop of foliage. It is doubtful if some of them come through the

winter alive. The Japan varieties seem to suffer the most in having the buds frozen. This is owing, no doubt, to the habit of starting growth so early in the spring, but still, in my opinion, they have a place in the commercial orchard.

Notes by G. C. Caston, (*Simcoe Station*).

The Japan plums are practically all gone, a few trees of Burbank, half dead, are all that are left.

Of about forty varieties of the European class tested only one, the Staunton, has proved hardy here. This plum is quite healthy yet and is getting to be quite a large tree. It is a large purple or bluish plum of good quality, not very prolific, and the season is very late. My opinion, based on several years' experience with a large number of varieties, is that cherries and plums cannot be grown profitably except near large bodies of water. In fact, not far outside of the peach belt. I have a few plums of the Americana class growing yet, but they are poor stuff.

Notes by Harold Jones, (*St. Lawrence Station*).

The only plum to fruit in this section this year was Hammer. Even the wild types in the fence corners failed completely.

Of the European varieties that remain healthy in wood are Geuii, Glass Seedling, Nos. 54 and 53 Dunlop's Seedlings.

In Japans, Maru and Ogon continue healthy in wood, but do not bear. Red June and Burbank are injured, but alive and bore a little fruit in 1905.

The plums of Americans planted here, such as Cheney, Wolf, and Wyant, are not true to name and are being discarded.

Notes by Chas. Young, (*Algoma Fruit Station*).

Four years ago if the question was asked, what are the best varieties of plums to plant in the north? I would, without hesitation, have answered: "Plant Japans"; and in making out a list I would have started out with Red June, Burbank, Abundance, etc. But if the same question were asked today, I would first consider the individual;—what are his facilities for growing ing them? Would he be likely to give them sufficient care, attend to the cultivation, and give them what little pruning they require, etc? Or would he be most likely to stick them in the ground and, without any further care, go back in two or three years looking for fruit? To the latter I would say, plant Americanas and make out a list to cover the season, the best of them are late in coming to maturity, say the beginning of October; and to the former, instead of replying, "Plant Japans," I would mix up the list something as follows: Red June, Burbank, Lombard, Glass Seedling, Arctic, Green Gage, etc., not omitting a few of the Americans to fill in a season like the present, when we have no other. I see by the reports that they are scarce all over the country; they are more than scarce here, for we have none at all. Of course, this is an exceptional year, but a good all round crop of the better varieties is not to be depended on any year, with the exception of Lombard in alternate years.

RASPBERRIES.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

The raspberry crop was much less than last year—about one-third. This was largely owing to the mild weather in January, followed by the severe frost; the summer also being very dry, the crop was materially lessened. A number of varieties have died out or have been discarded as worthless. The only varieties worthy of cultivation among the reds, are Marlboro', Herbert, and Cuthbert, ripening in order as given, but Herbert is by far the best yielder. In blacks, Conrath and Hilborn are the two best varieties; the purple varieties are not wanted in the markets, or the white either.

CUTHBERT: Plant, strong and vigorous, fairly hardy; fruit large, color dark red, quality best; yield, 216 oz. per 20 feet of row; ripe, July 20th.

HERBERT: Plant, strong, vigorous and very hardy; fruit very large, larger than Cuthbert; yield, 592 oz.; ripe, July 13th; this variety is by far the heaviest cropper of all raspberries.

MARLBORO': Plant, dwarfish in growth, hardy and healthy; fruit large, color red, quality very good; a good shipper, but rather dry for table use; yield, 272 ozs.; ripe, July 11th.

PHOENIX: Plant fairly vigorous, hardy and healthy; fruit medium to large, color red, quality good; yield, 170 ozs.; ripe, July 16th; will have to be discarded.

TURNER: Plant hardy, but lacks vigor; fruit small, soft, color dark red, quality good; yield, 223 ozs.; ripe, July 11th; will have to be discarded.

The *three best varieties* for commercial purposes are given in order of ripening, Marlboro, Herbert, Cuthbert; and for yield, Herbert, Cuthbert, Marlboro; for quality, Cuthbert, Herbert Marlboro'.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

I may dismiss the varieties known as Black Caps, or those which root from the tips, by saying that I have tried them and found them wanting. The objectionable features are, they are more tender than others as a rule; the weight of snow breaks them down; mice have a fondness for girdling the canes in winter; they do not sell well, and I have never raised a paying crop. I have still a few that I grow for comparison but do not advise any one to plant them here.

Of those propagated by suckers, I have only four varieties: MARLBORO': large and early, but not as profitable as the others. CUTHBERT: perhaps further south would be the most profitable, but here the tendency to keep growing into winter is against it, the tops are more or less injured every spring. This latter variety, unlike the former, makes too many suckers, which require cutting out several times during the summer. I have tried laying them down and covering with earth, but with no satisfactory results, and seldom get as good a crop as I do of the Louden, which is not as fine in quality, being somewhat crumbly. My very best raspberry for quality is BRINKLE'S ORANGE. I do not lay them down in winter; the tops of the canes will be frozen back a few inches, but this berry has a tendency to throw out strong side shoots in the spring and requires much more room and fewer plants in a hill than any of the others to give the best results. It is also more liable to disease than any of the others, but for one's own use I would strongly recommend this variety. LOUDEN, I would recommend for profit

alone. I think it is better not to pinch back the tops of the canes in summer, but let them grow until spring. It is profitable to grow them here even where there are plenty of wild ones going to waste. I did not get a full crop this year; dry weather set in just when they began to ripen, and materially reduced the yield.

Notes by G. C. Caston, (*Simcoe Station*).

The raspberries suffered from the same causes as the blackberries, and bore no fruit this year. We need something more hardy than Cuthbert to insure a crop every year. Looking over the lists of varieties tested elsewhere, I think the Herbert would probably fill the bill. This variety should have been tested at all the stations. I have applied for it three years in succession, but never got it. However, I have ordered a supply of plants for the spring on my own account, and will be able in a year or two to know whether it will be a success here or not.

Louden is a good berry, a little hardier than Cuthbert, but does not sucker freely and is slow to propagate. The same may be said of the Miller.

Marlboro's only qualification with me is its earliness—fits in nicely between the strawberries and the Cuthbert and other varieties.

I received a new variety this year called the Eaton, some of the plants of which bore a few specimens of fruit, and the berry is certainly a fine one. It will take a year or two to test it as to hardiness, but if it proves sufficiently hardy, it will certainly be an acquisition to the list.

STRAWBERRIES.

Notes by Prof. H. L. Hutt, O.A.C., Guelph.

The Ontario Agricultural College furnishes the following descriptive notes on a few of the leading varieties which have been tested at Guelph in comparison with over 400 other new and old varieties:—

Buster (Imperfect): The plant is very vigorous, with very long leaf stalk and large dark foliage. It is almost free from rust and propagates very readily. The fruit ripens rather late, is very large, only medium firm, and a salmon pink color, the seeds are deeply pitted. The quality is only fair and in flavor is slightly acid. This may make a good local market berry but is rather too soft for shipment. Compared with Clyde it is quite as large, somewhat firmer and a little darker in color.

Fountain (Perfect): A vigorous vine with large dark foliage, forming plenty of runners with strong fruiting crowns. This fruit is large, slightly conical in shape, somewhat inclined to be rough, very firm and a beautiful crimson color, seeds bright yellow. The flavor is mild sub-acid and the quality good. As a commercial berry it should rank favorably with Williams or Ruby.

Hero (Perfect): A vigorous plant with large light green leaves, makes runners freely and forms strong fruiting crowns. It is quite productive, the fruit ripens about midsummer, is of medium size, somewhat oblate in shape, medium to firm and a light crimson color. The quality is good, and the flavor pleasant. In trial shipments to Winnipeg by express, Hero arrived in better condition than any other in the consignment. As a commercial berry it is worthy of trial.

Parson's Beauty (Perfect): One of the most vigorous plants in the plot; the leaf stalk is stout and of medium length with a broad, dark leaf. A free plant maker and the fruiting crowns are very strong. It is very productive, the fruit ripens from mid season to late, is about the shape of Williams but has none of the objectionable green tip. The flesh is firm and the color dark crimson, seed yellow and few except at the tip. The quality is good and the flavor a pleasant sub-acid. As a late home use and market berry, Parson's deserves a place in any collection.

Ruby (Perfect): A good plant maker, the vines being stout and dark, very similar to Parson's Beauty. It makes runners freely and occasionally needs thinning to prevent the plants from becoming too thick. The fruit is large, firm, regular in shape, somewhat resembling Williams, but dark in color, the quality is good, flavor mildly sub-acid. This variety has done exceptionally well at Guelph, and is favorably reported upon from other sections.

Splendid (Perfect): A moderately vigorous vine with light green foliage, somewhat darker than most early varieties. It is a good plant maker and the fruiting crowns are strong. The fruit ripens among the earliest, is of medium size, very firm and a dark crimson color. The quality is good to best, and the flavor mild sub-acid to sweet. As a home use, early berry, it is hard to beat, and it is rapidly gaining favor as an early market variety.

Success (Perfect): The vine is fairly vigorous, making sufficient plants for a full row, but without any danger of overcrowding. The fruit ripens about mid-season, is conical in shape, of medium size, quite firm and a deep crimson color. It has a good appearance in the box, and from its record here for three years seems worthy of a place among the promising new varieties.

Warfield (Imperfect): The greatest plant maker in the plot, the leaf stalks are long and slender, leaves only medium in size. The crowns are strong and produce good fruit clusters. The roots are rather small and on dry soils or in a dry season it sometimes suffers from drought. Under favorable conditions, it is one of the heaviest croppers we have. The fruit ripens from early to mid-season, is slightly conical, medium size, very firm, and beautifully dark crimson color, seeds few and yellow, quality best, flavor acid. Highly esteemed for canning purposes.

Notes by E. B. Stevenson, (*Strawberry Station*).

The season of 1906 was an ideal one in most respects, at least during the fruiting time, although not perhaps so favorable earlier in the season; but, on the whole one of the most favorable we have had for many years. During April the frost was very slow in coming out of the ground; we had very hard frosts on the 21st, 22nd and 23rd; not much rain before May. May came in with cold nights and frost; but much rain the first week; cold rain on the 8th and 9th, with snow flurries and heavy frost on the 10th and 11th. It turned warm on the 13th, with a warm rain up to 16th, when it became very warm, making great growth; but we had frosts on the nights of 19th and 20th, hurting the early bloom, with thunder storms on the 24th and 26th. We had some more frost on 28th and 29th, when the strawberries were well out in bloom. Mrs. Fisher's first blossoms out; also Peerless, which is a very shy bloomer; North Shore is a late bloomer. Three W's is very full of bloom; also Howard's 3, which resembles the old Wilson.

June 8th: First ripe of Haverland and Clyde growing on a southern slope; on lighter soil, on the 11th picked first Irene and Tennessee Prolific on same soil.

June 13th: Van Deman, 1st picking on heavier soil, also Michel, August Luther, Oom Paul, Ernie, and Lord Sheffield.

June 14th: Early Beauty ripening, also Wild Wonder and Splendid.

June 15th: Good picking of Early Beauty, Oom Paul, Michel, Van-Deman, Heflin's Early, Ernie, and Howard's 2; and 1st picking of Beder Wood and Warfield, and on the south slope and lighter soil a grand picking of Tennessee Prolific, Splendid, Parson's Beauty, Sample, Clyde and Haverland, which sold at 15c. per box in Guelph.

June 17th: First picking of E. Hathaway, Greenville, Wilson, 20th Century, Alice Hathaway, Senator Dunlop, and Johnston's Early; also Excelsior.

June 21st: We have had a week of rain; fog, with great heat; rust has developed on some varieties, viz., Howard's No. 2, North Shore, President Roosevelt, Wild Wonder; some on Seaford and Williams; picked Catharine and Lyon for the first.

June 22: Continued rain; berries growing large and fine; sold all I had at 10c. by the crate.

June 23: Picking most of the varieties to-day, except Abingdon, Cardinal, Mrs. Fisher, Peerless, Howard's 7, New Home, Elma, and North Shore; North Shore rusting very badly.

June 25th: A grand picking to-day; best berries I ever saw; very choice; sold best for 13 cents per box; the rest for 12½ cents. Howard's No. 3 and Three W's are both very heavy bearers, also Bismarck, very productive. Of the Three W's, I picked three boxes without moving; an immense crop.

June 27th: Picked Abingdon, Cardinal, North Shore, Ben Davis, Wonder, Commonwealth, Uncle Sam, Boston Prize, Minuteman.

June 29: Good picking Uncle Sam, Minuteman, Nimrod, and Victor.

July 2nd: Michel and E. Hathaway, Early Beauty and Ernie; Heflin's E. about over. 1st picking of Elma to-day, and also latest. The best to-day were: Three W's. Howard's 103, Annie Hubach, Auto, Lyon, Mead, Kitty Rice, Nellie Hubach, Wonder. President was grand, Minuteman, Howard's No. 7, Seaford, Woolverton, Saunders, Challenge and Beaver; a good picking of Almo; a fine picking of Cardinal, strong fruit stem, holding the berries up, easy to pick. Best sold for 15c. per box; the bulk of the picking sold for 10c. per box.

Three W's yielded to-day a box for every 2 feet of row. The best of the berries went 27 berries to the box—three layers of nine to each layer; 3 rows of 3 in a row; New Home, late, resembles Gandy; good picking of Aroma.

July 6th: Picked Howard's 96 and Howard's No. 2.

July 9th: Had a fine picking to-day of the following: President, Senator Dunlop, Woolverton, Abingdon, Haverland, Cardinal, Irene, Lyon, Auto, Minuteman, Boston Prize (too soft), Mrs. Fisher, Prof. Fisher, Uncle Sam, Bismarck, Elma, Latest, Aroma, Brandywine, North Shore, New Home, Gandy, Gen. de Wet, Peerless, Glen Mary, Commonwealth.

July 13th: Picked Abingdon, Cardinal, Mead, Latest, Irene, Three W's, Woolverton, Aroma, Klondike, Mrs. Fisher, Elma, Prof. Fisher.

This has been a year of very large berries and good prices. The rains, and warm, sunny weather following was just what the strawberries required to bring them to perfection; showing how much water strawberries require to produce their best. This was a season when we might say we had irriga-

tion, for we had all the water we needed, and had it just when wanted; we can also say this was a season when the wide, matted row showed up well, from which we picked almost as fine berries as from the narrow row. The wide row, having all the water needed, produced a great crop. Some varieties are especially responsive to conditions, the Sample and Dunlop especially so. On narrow rows and on lighter soil they ripen almost as early as Success; while on heavier soil and in wide matted rows, their season is almost as late as Gandy. For a juicy berry for the market, Kitty Rice, Minuteman, or President seem to be about perfect, being good growers, good yielders, perfect in form, regular, good color with a shine to them, firm and fair quality; they also look fine when in the crate. Among the best late varieties I may mention the Commonwealth. It ripens about with Gandy, is as large and fine as any and is very firm. Cardinal was at its best and is without doubt one of the best late sorts. The plant is all that could be desired except its pistillate blossom; the fruit stalk is large and strong, holding fruit up well; berry, large, glossy, easy to pick.

It is a good plan to test new varieties in the different ways, viz., hill, narrow and matted row, to discover to which way they seem best adapted. A few plants could be thus treated in each style so that comparison could easily be made. Many growers who have never tried the hill or narrow row system would be amazed to see the capacity of a strong, vigorous plant, whose runners have all been kept off; the size of the plant would surprise them, and the masses of fruit the plant would surround itself with would be a perfect revelation in fruit raising. There are not many, but those that have tried are aware of the productiveness of the strawberry when conditions are perfect.

The grower, who loves this plant, will note with great interest the various characteristics of the new kinds as they come out. It is wonderful how much each variety shows of a distinct individuality. There is an almost endless diversity in color of leaf, size of plant, growth; in length and size of runners, and in vigor; in shape and size of leaves. There is the plant that is small and hugs the ground, and the big, strong, rank grower, 14 inches high. There is the round, compact plant with close, dense growth of leaves; there is the flat, spreading, straggling plant with few leaves. Here is a plant most prolific in runners, and another one with very few. Here is the plant with runners making a plant every 12 or 14 inches from the parent, and there a plant with runners making new plants every 3 or 4 inches. Here are plants with runners like thin, wiry cords, and there are others with runners thick and fat like a lead pencil; here is a plant with a long, narrow leaf, and another with round, blunt-shape. Here is one thin and delicate of texture, and there is another thick and leathery. Here is a variety with a very dark green color having almost a black tinge; there is the light green, and another almost yellow; and so on in almost endless variety. The grower who loves his work will note all these points of differences and so come to know them.

My plots were treated as follows: The land had, for two previous seasons, roots on it; a good coating of stable manure, well rotted, was given, and it was then well ploughed and worked. After this, and just before planting, a light sowing of bone meal was given; then the plants were put into the ground, and kept free from weeds by frequent cultivation. In fall, after growth had stopped, a coating of coarse manure was put on. This mulch in the spring was raked into the rows between the plants. I did not give any spring cultivation. My trial plots yielded at the rate of 8,125 boxes per acre. I sold them, the best for 15c., some for 12½c., the balance none for less than 10c.

The old standards held a good place this season, and any variety that did not do fairly well the past season should be discarded at once, as not worth growing for any purpose. Among the best of the old sorts I might mention Haverland, Splendid, Tennessee Prolific, Sample, Williams, Brandywine, Glen Mary, Senator Dunlop, Warfield, Ruby, and Parson's Beauty. Among the newer varieties that stood in the front row this year are: Abingdon, Annie Hubach, Auto, Ben Davis, Commonwealth, Cardinal, Early Hathaway, Early Beauty, Kitty Rice, Latest, Minuteman, Mrs. Fish, Ernie, Heflin's Early, President, "Three W's," Uncle Sam, Victor, Wonder, Howard's No. 3. I will now endeavor to give a description of the different varieties in my trial plots and their worth to the public, in alphabetical order:

Annie Hubach (Perfect): Sent out from Arkansas by H. & H.; good plant, strong and healthy, light green color, good runner, quite productive; berry large, bright scarlet, yellow seeds, berry hollow, pink flesh, fair quality; medium early.

Abingdon (Perfect): Sent me by L. Blanchard, Mass.; a choice seedling; plant large, strong, healthy, yellow green, quite productive; berry large, roundish conical, crimson with red seeds, some of the pistillate berries cockscomb; flesh whitish pink, good quality, late, worth a trial.

Arkansas Black (Perfect): I will discard this.

Alice Hathaway (Perfect): From Arkansas; healthy plant, good runner, productive; berry medium to small, scarlet, good quality.

Almo (Imperfect): Sent me by Slaymaker & Son, of Delaware; chance seedling, found by Jas. Bane, of Judsonia, Ark.; plant strong, healthy and good size; good runner, berry about size of old Wilson; it is a dark red in color; the plant is quite productive, well worth a trial.

Auto (Perfect): Sent out from Maryland; fine strong plant, healthy, good grower, quite productive; berry very large, dark scarlet, yellow seeds, roundish; flesh red and white streaked, medium in firmness, good flavor and quality; a fine one; one of the best this year.

August Luther (Perfect): Is early; plant small, does well on some soils; berry medium in size.

Armstrong (Perfect): This variety, some say, is the same as New York, Corsican, Maximus, and Uncle Jim. The plant is large, strong and healthy, a good grower; medium in productiveness; berry is large to very large and good flavor.

Aroma (Perfect): One of the best late kinds; plant strong and healthy; the berry is large, round and fine; ripens about with Gandy and later.

Ben Davis (Perfect): Plant strong, good grower and healthy, productive; berry large, roundish conical, blunt at end, scarlet with yellow seeds, solid; flesh firm, pink, good quality and fine flavor; a good one, nice to eat out of hand.

Beaver (Perfect): Sent me by M. Crawford, of Ohio; did better this year than ever before; plant hugs the ground, good grower, medium in productiveness; berry roundish conical, bright crimson, red seeds, the berry shines as if varnished; flesh pink, hollow, good spicy flavor and fine quality; a good dessert berry.

Boston Prize (Imperfect): Sent from North Carolina; plant good grower, healthy and productive; berry large, conical, pale scarlet pink, yellwo seeds and soft fair quality; not very desirable.

Buster (Imperfect): Sent me some years ago by C. C. Stone. The plant is strong, healthy, quite productive, good grower; foliage dark green color;

the berry is large, roundish, bright red, medium in firmness, acid; medium to late season.

Bismarck (Perfect): One of the best.

Brandywine (Perfect): One of the best.

Bubach (Imperfect): One of the best old sorts.

Beder Wood (Perfect): One of the best.

The above varieties have been so often described, they are so well known, they need no further description than to say they did well the past season, especially Bismarck.

Catharine (Imperfect): Sent me from Delaware, originated by J. F. Cannon. The plant is large, with thick, broad foliage, quite productive, good runner, makes plants freely; berry is large, roundish conical; red to the centre, colors all over; only need in firmness; good for near market.

Commander (Perfect): Plant large, strong and healthy; only a few plants left to fruit, white grub injured it; will give report after another year's growing.

Clyde (Perfect): One of the best known; very productive; did well, but does not make plants as freely, nor is the foliage as abundant as formerly; berry large, scarlet, good quality.

Commonwealth (Perfect): Sent me from Massachusetts; originated by W. H. Munroe. Plant large, strong and healthy, productive; berry conical, large, dark crimson, seeds red, flesh red all through, mild flavor, firm; a good late.

Cardinal (Imperfect): Sent me by the originator, Mr. Streator, of Ohio. The plant is strong, large and healthy, not a trace of rust, quite productive; fruit stalks are strong and hold the fruit well up, making it easy to pick; the berry is medium to large, and good color, looks well, firm and good quality; a valuable addition to our list; well worth a trial by commercial growers.

Corsican (Perfect): See "Armstrong."

Climax (Perfect): Seedling from Bubach, by Mr. Graham, of Maryland; plant healthy, quite productive; berry large, roundish, scarlet, early.

Challenge (Perfect): This is the first year the Challenge has amounted to anything with me; it had some very fine berries on this year, of best quality; not profitable.

Duncan (Perfect): An utter failure with me. I did not get a single berry from this variety; it is reported as doing well in other places.

Early Hathaway (Perfect): Sent me from Missouri; the plant is healthy, good runner; berry is roundish conical, flesh red all through, acid, fair quality, medium to large; scarlet, with yellow seeds; a good medium early; worth a trial.

Ernie (Perfect): Plant healthy, a good grower, quite productive; berry ripens early, red with yellow seeds, round, large; a good medium early, good quality; well worth a trial.

Early Market (Perfect): From Arkansas; plant good runner, healthy, medium productive; berry scarlet, round and medium in size.

Early Beauty (Perfect): A good plant maker; quite productive; a good early berry; roundish; red; flesh red, acid, but good quality; worth a trial; a good one.

Elma (Imperfect): A seedling from crossing Nettie and Roblin, fertilized by Joe; sent me by Jos. H. Black, of New Jersey; plant strong and healthy, good grower, productive; berry large to very large, round in shape, bright red, medium in firmness; flesh pink, nice spicy flavor and good quality; very late; first picking July 1st, last picking July 15th.

Emperor and Empress (Perfect): By the late J. Little; resemble each other very much; same origin; plant strong, healthy, good grower, medium in productiveness; berry large and good quality; resembles the old Jessie very much.

Fairfield (Perfect): Good plant maker; berry large, red, firm, and fair quality; it is an early; worth a trial.

Floretta (Perfect): Seedling of Bubach by Dr. Brown; plant good grower and healthy, fairly productive; berry large, somewhat irregular, a good early.

Gen. de Wet (Imperfect): Seedling of Bubach and Parker Earle, from N. J.; plant strong, healthy, a good grower, medium in productiveness; berry large and fine, somewnat soft, good color.

Great Washington (Perfect): Plant good grower, some rust, free runner and productive; the berry is large, conical, scarlet, quite firm, good flavor.

Gandy (Perfect): One of the last if not best late; so well known needs no further description

Glen Mary (Perfect): One of the standards; plant strong, large and healthy, well known, did very well this season, hard to beat.

Granville (Perfect): Plant large, strong and healthy, a good grower, supposed to be from Minner's Prolific; berry is large, oblong, dark shining red, wasted; flesh solid and white inside, fine flavor; season medium to late.

Greenville (Imperfect): Plant good grower, dark green like Bubach, quite productive; berry large, good color, resembles the old Bubach; medium in firmness; a good one for a near market.

Howard (Perfect): By J. H. Black, of New Jersey, from seed of Burton's Eclipse, crossed with Gandy; the plant is strong, healthy, dark foliage; very large, dark red and firm, season late, a good one.

Howard's No. 2 (Imperfect): Originated by the late G. W. Howard, of Michigan; plant healthy, good runner, small, with some rust, but quite productive; berry medium to large, roundish, solid; flesh pink and medium in firmness; good quality; did well and worth trying.

Howard's No. 3 (Perfect): Originated by A. B. Howard, of Massachusetts; plant healthy, very productive, good grower, light foliage; berry medium to large, solid, conical, bright scarlet, yellow seeds, firm, good quality and good flavor; a good market sort; well worth a trial.

Howard's No. 7 (Imperfect): By A. B. Howard, of Mass.; plant strong and a good grower, productive; berry conical, good quality; a good one; worth a trial.

Howard's No. 96 (Perfect): By G. W. Howard, of Michigan; plant good grower, healthy, and quite productive; berry medium to large, roundish, dark scarlet, yellow seeds; flesh red all through, solid, firm and of good quality; well worth a trial.

Howard's 103 (Imperfect): Originated by A. B. Howard, of Massachusetts; not yet offered to public, sent me for trial; the plant is healthy one, good grower and very productive; the berry is large, roundish, conical, dark scarlet, firm and good grower; the flesh is solid and white inside, seeds imbedded; a good early; will prove a good market sort.

Ham (Perfect): By J. H. Black, of New Jersey; a seedling of Mary and Parker Earle, a good grower, plant strong and very healthy, dark foliage; berry large, dark red, smooth and firm; flesh deep red, good quality; well worth trying.

Heflin's Early (Imperfect): This did very well this year; was one of the best medium earlies; the plant is healthy, the berry a good size for an early; well worth a trial.

Haverland (Imperfect): One of the oldest and yet one of the best, most productive and best market berries we have; did very well; so well known needs no description. It is still at the front.

Irene (Imperfect): Did well; plant healthy, good grower, quite productive; berry good color and size, well known; a good one.

Joe (Perfect): Seedling sent me by J. H. Black, of New Jersey; the plant is a strong, vigorous grower, healthy and productive; the berry is large, bright scarlet, obtuse, conical, very uniform in size, quality is good, season medium to late; a good one, worth trying.

Kitty Rice (Imperfect): Plant a good grower, making plants freely, healthy and productive; berry large, roundish, good color with a gloss; for a fancy market; firm and fair quality; looks fine in the crate; well worth a trial.

Lyon (Imperfect): Plant healthy and good grower, quite productive; berry dark glossy red, long pointed, red seeds, flesh also red, good size, resembles the old Longfield; mid season to late; berry is good quality, spicy; a good one.

Latest (Imperfect): This came from Massachusetts, by S. H. Warren; the plant is healthy, strong, stools out, makes few runners, quite productive; the berry is large, conical, good crimson color, flesh red, good quality; one of the latest, a good one.

Louis Hubach (Imperfect): A seedling sent from Arkansas by Hubach and H; plant healthy, good grower, productive; berry bright dark scarlet, yellow seeds, conical, flesh red all through, and solid, medium in firmness, fair quality.

Luccas (Perfect): Plant makes runners freely, healthy, productive; berry round, scarlet, medium in size, good quality; did well.

Lester Lovett: This is so like Gandy it is almost impossible to see any difference between them.

Mrs. Fisher (Imperfect): Seedling of Bubach and Sharpless, sent me by J. H. Black, of New Jersey; plant strong, healthy, good grower, quite productive; berry large to very large, bright scarlet, medium firm, good quality, late, valuable for near market.

Mead (Perfect): It is a fine grower; the plant is strong and healthy, not a trace of rust; the foliage is dark green; the plant is quite productive; berry is large, roundish, coloring evenly, firm and good quality; a fine one; well worth a trial by all growers.

Mark Hanna (Imperfect): A strong grower, healthy, productive, and produces very large berries; somewhat rough, but of good color and fair quality.

Mrs. Mark Hanna (Perfect): Plant is strong, developed some rust; the berry is large, but not very desirable.

Mrs. Miller (Imperfect): Plant large and healthy, free of rust and productive; the berry is large, bright dark red, flesh red, oblong, somewhat flattened and good quality; season medium to late.

Mellie Hubach (Imperfect): Sent me by Hathaway and Hubach, of Arkansas; the plant is a good grower, healthy, makes runners freely, and very productive; the berry bright scarlet with yellow seeds, conical, blunt at end, slight neck, flesh pink and white in center, acid but good flavor; a good market berry.

Morning Star (Perfect): Not very desirable.

Minute Man (Imperfect): Plant a good grower, strong and healthy and quite productive; berry large, roundish, conical, crimson with yellow seeds: flesh reddish pink all through, medium in firmness, good quality; a good one for maket, even a fancy market.

Margaret (Perfect): One of the fancy kinds grown for a fancy market; it is late; plant healthy; berry large and fine looking; a good one, one of finest.

Marie (Imperfect): Seedling of Crescent; the plant is strong and healthy and quite productive; did very well this year; the berry is roundish, large, somewhat irregular, solid; flesh pink, somewhat sour but spicy, medium firm; a good market berry.

New York (Perfect): Resembles Corsican and Uncle Jim; plant large, strong and vigorous, healthy, medium in productiveness; berry is large, somewhat rough, good flavor, a fancy berry; did well this season.

Nimrod (Perfect): Plant originated by J. F. Bever, of Dayton, Ohio; the plant is small, hugs the ground, lies very flat, but is healthy, medium in productiveness; the berry is medium in size, bright scarlet, roundish conical, resembling the old Jersey Queen, solid, flesh pink, very good quality; might do for a fancy berry for the amateur.

North Shore (Perfect): Originated by W. H. Munroe and introduced by Mr. Pratt of Massachusetts, the introducer of Sample and Commonwealth; the plant with me is a good grower but it rusted very much the past season; it had some fine berries on but no doubt the crop was diminished very much by the rust; the berry is large, with yellow seeds; it is quite late in season; will give it another trial.

New Home (Perfect): Sent me by the introducer, W. F. Allen, of Maryland; the plant is strong and vigorous, a good grower, resembles the Gandy very much in plant as well as in the berry, same season; I should almost take it for Gandy; large, firm, good quality, but with me no more productive than the old Gandy.

Oom Paul (Perfect): Sent me by Mr. Kevitt, of New Jersey; the plant is large and healthy, making plants freely, only medium in productiveness; the berry is large, rather long and somewhat irregular, dark red and fair quality; did only fairly well.

Olive's Pride (Perfect): Sent me by Mr. J. W. Hall, of Maryland; the plant is a very vigorous grower, healthy and very productive; the berry is very much like the old Crescent in size and shape; a good market sort; did well the past season.

Oscar's Early (Perfect): I have dropped this variety as undesirable.

Olympia (Perfect): I have dropped this as undesirable; it has some good qualities, but not enough to keep it on the list.

Parson's Beauty (Perfect): One of the best; plant is strong and healthy, dark green foliage, and very productive; the berry is large, conical, resembles the Williams in shape and color; yellow seeds, medium in firmness, sub-acid, pleasant taste; one of the best market sorts.

Reynolds (Perfect): Originated in Delaware and sent me by W. S. Todd, of Delaware; the plant is large, with thick, leathery, dark green foliage, free from rust, a good grower, making plants freely, and productive; the berry is large, dark scarlet, with yellow seeds, flesh red to center, fair quality.

President (Imperfect): Plant large, good grower, has some rust, fairly productive; the berry is large and fine looking; made a good showing; would sell well and bring a fancy price; it did very well with me this season; worth a trial.

President Roosevelt (Imperfect): Plant a good grower, productive, makes plants very freely, but develops rust; did so the past season; berry medium in size, roundish, dull red color with red seeds, solid pink and white in center; flavor is good; not very desirable.

Peerless (Perfect): Plant is large and strong, dark color and very healthy, a good runner, shy bearer; the berry is large, roundish like Bismarck in appearance, only darker in color, fine flavor and best quality, but does not bear enough; only for the amateur grower.

Perfection (Perfect): Plant healthy, a good grower, but has some rust; quite productive; berry medium in size, conical, dark scarlet, firm and of good quality; did well with me this season.

Prof. Fisher (Perfect): A seedling of Bubach and Sharpless, sent me by J. H. Black, of New Jersey; the plant is large, strong and healthy, good grower and productive, fair quality; resembles Mrs. Fisher; did well.

Ridgeway (Perfect): Plant is healthy, stools out somewhat, productive; the berry is medium to large, dark bright red golden seeds, roundish; flesh red, firm and very good quality; mid season; had some very beautiful berries; a good one.

Ryckman (Perfect): Plant large and healthy, good runner, medium in productiveness; the berry is large with a neck, roundish, conical, good quality; is not productive enough with me; could be grown for a fancy market for dessert.

Seaford (Imperfect): This old variety did very well this year; produced some of the most beautiful berries I had; the plant is subject to rust but is a good grower; makes plants freely, and productive; the berry is long, large, dark crimson, yellow seeds, glossy, of best quality; a very fine one.

Sample (Imperfect): One of the best market sorts; does well everywhere; is well known now; it has always done well with me; plant is vigorous grower, healthy and very productive.

Splendid (Perfect): Another splendid sort well named; a good pollenizer; the plant is a great grower of healthy plants, and very productive; the berry is large round, a bright scarlet, good quality; sold the first picking of Splendid for 15c. per box; one of the best market varieties.

Success (Perfect): Plant is healthy, strong, good grower, productive and early in fruiting; the berry is medium to large, roundish, good scarlet, good flavor; not very firm; all right for home grower.

Senator Dunlap (Perfect): This is another grand berry, amongst the best this season; a rampant grower, as vigorous as any we have ever had and very productive of very large, regular, conical berries of a good dark scarlet or crimson; firm, medium, early to late; one of the best market varieties; well worth a trial.

Sutherland (Imperfect): Good grower, healthy; berries medium in size; did well.

Superior (Perfect): Made a good return; did very well.

Stevens' Late Champion (Perfect): Plant is healthy, a fair grower; long runners, dark green foliage, productive; the berry is large, good color; worth a trial.

Tennessee Prolific (Perfect): One of the best market varieties; plant is a vigorous, healthy grower, not a trace of rust, and very productive; the berry is large, bright scarlet, firm and good quality; has always yielded a bumper crop.

"Three W's" (Perfect): This new one was one of the very best for market; at one of the pickings I picked three boxes without moving; at another later picking I picked a box for every two feet of the row; very

productive; the plant is large, healthy, a vigorous grower; the berry is large, conical, blunt at end, fine bright red scarlet, seeds yellow, fine mild flavor, medium firm flesh, pink to white; one of the best of all this year.

Texas (Perfect): Plant is healthy, good grower, large size; does not make runners very freely; medium in productiveness; berry is large, red, firm, good quality; a good early.

Uncle Jim (Perfect): Like New York (See Armstrong); resembles Corsican; I had Uncle Jim, Corsican and New York growing side by side; I could see no difference between them either in plant or fruit or season.

Uncle Sam (Imperfect): The plant is large, strong and healthy, a good runner and productive; berry large to very large; if not the largest; roundish, scarlet, red and yellow seeds, flesh pink, good quality and flavor, medium in firmness; a good one; worth a trial.

Van Deman (Perfect): One of the earliest; has a long season; does very well in some places and not so well in others; has done well with me; I picked it with the earliest, and it was one of the last; firm and best quality; a beautiful looking berry; looks as if varnished; well known.

Victor (Perfect): A good new variety sent me by Mr. Crawford; plant is strong, healthy, a good grower, dark green foliage; quite productive of fine looking large berries, dark crimson, with yellow seeds, firm and good quality; will be a good canner; originated by D. J. Miller, of Ohio.

Wonder, or Sampsel's Wonder (Perfect): The plant is a strong, healthy grower, and quite productive of large to very large dark bright red berries; good quality; it is medium to late; one of the best; has come to stay with the the standards.

Wilson (Perfect): Did fairly well, but there are so many better now I only grow it for the sake of comparison with the newer varieties.

Wild Wonder (Perfect): Sent me by the originator, J. Shank, of Illinois; a rampant grower, plant small, and rusted very badly; berry small, soft, but good grower; not very desirable.

Wm. Belt (Perfect): An old standard; made a good showing; kept its place in front; so well known, not necessary to describe it; plant good grower, rusts some; first berry sometimes irregular; the rest are very regular, of conical shape, large and firm and fine quality; a good one.

Williams (Perfect): So well known, no description; did well.

Warfield (Imperfect): Never did better; most productive of beautiful, dark crimson berries; wants lots of water to do its best.

Woolverton (Perfect): Did well; produced some of the finest berries; a fancy variety for fancy market.

Yant (Perfect): Plant strong, healthy, light green foliage, good grower and productive; berry is large, regular, with neck conical; good color; mid season; did well.

New Varieties for Trial.

I have received several new varieties and planted them in a trial plot for next year's fruiting. Most of them have made a good growth, free from rust. They are as follows: Advance, Abundance, Arnouts, Chesapeake, Hummer, Hundred Dollar, Beidler, Jacoma, Beaners, E. H. Ekey, Pride of the Valley, Oak's Early, Somerset Maid, Virginia, May King, Thompson's No. 3, "No. 99," Great Ruby, Nehring's Gem, King Edward.

List for Growers and Season of Fruiting.

Extra Early and Early.

Van Deman, Michel, Success, Howard's No. 3, Excelsior, Cameron, Howard's No. 103, Johnson's Early, Beder Wood, Lord Sheffield, Texas, Early Hathaway, Springdale B., Fairfield, Ham, Staples.

Mid-season.

Burbach, Haverland, Reynolds, Splendid, Bismarck, Sutherland, Marshall, Tennessee Prolific, Senator Dunlap, Parson's Beauty.

Mid-season to Late.

Three W's, Victor, Wonder, Glen Mary, Lyon, Marie Saunders, Williams, Wm. Belt, Brandywine, Emperor, Woolverton, President, Kitty Rice, Yant, Mrs. Fisher, Sample, Uncle Sam, Uncle Jim.

Late to Extra Late.

Joe, Aroma, Gandy, Abingdon, Cardinal, Stephen's Late Champion, Nettie, Greenville, Latest, Howard's 96, New Home, Elma, North Shore, Commonwealth.

Notes by A. E. Sherrington, (*Lake Huron Station*).

The strawberry crop here was a very poor one the past season, owing chiefly to the very dry season; the plants simply died outright with the drouth; the yield was only about one half. The varieties grown at the station as a main crop are Brandywine and Saunders, with a few Michel for early berries. A number of new varieties were planted in the spring.

Brandywine: Plant a strong, vigorous grower; fruit large to very large, color dark red, quality the very best; a first-class berry for canning purposes.

Saunders: Plant not as vigorous as Brandywine, but makes a good row; fruit large, dark red and firm, also a good canning berry.

Michel: Plant a great plant maker, needs to be planted in the row 24 to 30 inches, and the rows 4 feet apart; fruit, medium sizes, soft, but a good table berry, but does not yield enough to make it a profitable berry.

Notes by Chas. Young, (*Algoma Station*).

This is without any exception the best money-making crop I can raise. I do not care to tell every enquirer how much an acre of strawberries, at 10c. a box, will total up to, for in many cases my assertion would be received with the customary grain of salt; but I am always willing to advise anyone within reach of a village to try a few hundred plants, and have given away many thousand plants, just to encourage the cultivation. I have grown a good many varieties since I first settled here, but am not yet prepared to say which is the best berry. Some I have discarded altogether; others did exceedingly well for some time. Clyde, for instance, is now useless with me. Others again, highly recommended in the east, are away down with me—Williams, for example—and Texas, highly recommended by some growers,

last season hardly produced one-fifth of a crop. I still keep a few plants set out, even of the kinds that have failed, just for an object lesson to enquirers. I have found that when an old variety begins to fail it keeps getting worse; never better.

There are here sixteen varieties grown for market, the best of which last year was the old Bubach, closely followed by Brandywine, Glen Mary and Tennessee Prolific about equal, making a third of the number. Of the others received for experiment, one dozen of each, some had evidently been too long out of the ground. Judging from the return made last season there is no improvement. I have set out plants of all that made any runners for further trial. I plant in the spring, as soon as the ground is in working order, on ground that had been heavily manured for a previous root crop, in rows four feet apart and two and a half feet between the plants. This may seem a waste of ground to most growers, but land in the north does not cost much per acre, although manual labor does, and by planting at this distance I can do the greater part of the work with the cultivator. I never cover in the fall as it is not needed here, and I only take off one crop. The extent to which I grow is only limited to my ability to obtain pickers. I have advised several to go into strawberries, but still the demand for nice clean, fresh berries far exceeds the supply. Our season is later than in the east and lasts about five weeks. I have some seedlings which so far promise well, obtained from a grower in the east, which may produce something to be reported on later.

Notes by G. C. Caston, (*Simcoe Station*).

I am now growing Fairfield and Lester Lovett, and I want something better than either. I have tried upwards of a hundred varieties of strawberries, and the most profitable of the whole list was the old Wilson and Crescent. But they have had their day, and we have nothing that I know of in the whole list of new varieties to take their place. Many new varieties are very fine berries, but when you pick them three times they are practically done, while the old Crescent and Wilson you could pick for two weeks or more and still be getting good berries. We shall probably never get the ideal strawberry, but if we want a really profitable berry, it will need, in my opinion, to have some Wilson or Crescent blood in it. I have tried a number of seedlings of my own, but never got anything that was worth propagating, until now I have one which I believe is a cross between Crescent and Williams, which I have decided to propagate. But it will need several years of trial under varying conditions, before knowing whether to recommend or discard it.

Notes by Harold Jones, (*St. Lawrence Station*).

Strawberries were badly injured during the past winter owing to no snow and deep freezing of the ground in March. The varieties that gave the best results are: Woolverton, Williams, and Saunders. William Belt did fairly well, but was injured very much. Brandywine does not bear profitably, and the berry is too seedy, but the plant came through the winter remarkably well.

Of the newer varieties planted they were in most cases destroyed, and I had no opportunity of comparing values.

VEGETABLES.

Notes by Prof. H. L. Hutt, O.A.C., Guelph.

The following is a list of the varieties of vegetables recommended for general growing as a result of the tests conducted in the Horticultural Department of the Ontario Agricultural College, Guelph:

Asparagus. Conover's Colossal, Palmetto.

Beans. *Early*: Keeney's Rushless Golden Wax, Wardwell's Kidney Wax; *Medium*: Davis' Wax, Stringless Green Pod, Valentine.

Beets. Egyptian (for extra early and transplanting): Eclipse Model, Black Red Ball (the darkest of the turnip varieties).

Brussels Sprouts. Long Island Improved.

Carrots. *Early*: Early Horn, Chantenay, Danvers, Rubicon (an improved Chantenay).

Cabbage. *Early*: Early Jersey Wakefield; *Medium*: All Head, Early Summer; *Late*: Danish Round Head, Houser (a very late variety not subject to black rot); *Red*: Mammoth Red Rock.

Cauliflower. Erfurt Extra Select.

Celery. *Early*: White Plume; *Medium*: Paris Golden Yellow, Chicago Giant (an improved White Plume with extra heavy stalks); *Late*: Evans, Triumph.

Corn. *Early*: Cory, Golden Bantam; *Medium*: Crosby's, Kendall's Early Giant; *Late*: Stowell's Evergreen, Country Gentleman.

Citron. Colorado Preserving.

Cucumber. White Spine, Westerfield Chicago Pickling.

Egg Plant. Black Beauty.

Kohl Rabi. Early White Vienna.

Lettuce. *For Forcing*: Grand Rapids, Hot House; *For outdoor, loose head*: Black Seeded Simpson; *Heading*: Hanson, Denver Market, Deacon, Cos Trianon.

Leek. Messelburg.

Muskmelon. Rockyford, Montreal Market, Hackensack.

Onions. *White*: Southport White Globe; *Yellow*: Yellow Globe Danvers, Golden Globe, Prizetaker; *Red*: Red Wethersfield, Red Globe.

Parsnips. Hollow Crown.

Peas. *Early*: Steele-Briggs Extra Early, Nott's Excelsior; *Medium* Gradus; *Late*: Improved Stratagem, Champion of England.

Potatoes. *Early*: Early Ohio; *Medium*: Burpee's Extra Early; *Late*: Empire State.

Pumpkin. Sweet Sugar.

Radish. *For Forcing*: Rosy Gem, Scarlet Globe, Scarlet Conical; *Early*: Scarlet Turnip White Tip, Olive Shape French Breakfast, Long Scarlet Short Top; *Summer*: Chartiers, White Delicious; *Winter*: China Rose, Black Spanish, Osake.

Rhubarb. Victoria.

Salsify. Sandwich Island.

Spinach. Victoria.

Squash. *Summer*: Crookneck, Delicata; *Winter*: Hubbard, warted, Golden Hubbard, Marblehead.

Tomatoes. Earliana, Chalk's Jewel, Success, Matchless.

Turnip. Extra Early Purple Top Milan, Golden Ball.

Vegetable Marrow. Long White Bush.

Watermelon. Hungarian Honey, Cole's Early, Halbert Honey, Iceburg.

Beets.

Among the 52 varieties tested the following are a few of the promising newer kinds:

Black Red Ball (Burpee): Shape round, but inclined to get angular with age; tops medium in size; color very dark, flesh color very dark red, zoned with crimson; quality good; season medium.

Early Model: Shape deep globular; size medium; color dark; quality good; tops medium in size and upright; season medium. Well worthy of a trial.

Dark Ox-blood (Bolganio): Size large; turnip shaped, with large tap root; quality good; color dark; season medium.

Ruby Dulcet (Johnson & Stokes): Shape nearly round; size medium; color of flesh deep red zoned with crimson and white; quality good; season second early.

Columbia: Round, turnip shaped, large size; tops medium; flesh color dark; quality good; season medium.

Crimson Globe: Shape globular; tops medium and upright; flesh color crimson, lightly zoned with white; quality good; season second early.

Carrots.

Among the 26 varieties tested, the following are promising new kinds:

Rubicon: Originated on Long Island, is of much the same shape as Chantenay; tops small; color of flesh deep red; fine grained. Was one of the heaviest yielders in last year's test.

Scarlet Beauty: Tops medium in size; shape of root between half-long and long; color deep scarlet; quality good; season medium to late.

Pride of Market: Half-long, medium size; dark color; quality good; season early.

Cabbage.

Among the 68 varieties tested, the following new varieties are worthy of note:—

Houser: Shape flattened globular; very late; hard header, good keeper; proved to very free from blight; foliage broad, dark green with brown tints.

Diamond Winter: Large solid head of the Flat Dutch type; foliage light green; short stem; head broad, flat and well covered with leaves.

Eureka and Alpha: Are alike, maturing about the same time as Early Wakefield; heads flat, quite deep and solid.

Glory of Enkhousen: A promising mid-season sort; head medium in size, very solid; shape flattened globular.

Danish Round Head: This is an earlier, shorter stemmed type of the Danish Ball Head. Heads averaging larger in size than the Ball Head, extremely hard and solid.

Celery.

The following new varieties of celery are worthy of note:—

Snow White: This is a select strain of White Plume, and appears to be an improvement on that variety, being truer to type and a little taller.

Chicago Giant Self Blanching (Vaughan): To all appearances a cross between Giant Pascal and White Plume, with the thick solid stalk and excellent quality of the Pascal and self-blanching habit of the White Plume. Is well worthy of a trial.

Magnificent (Gregory): A new winter celery of a very strong growth; a good keeper, and will compare in flavor with Paris Golden.

Lettuce.

Among the 72 varieties tested, the following are worthy of additional note:—

Morse: Plant forms a large, well-formed cluster of leaves, and may be used early, very slow to go to seed; leaves large, broad, stiff and blistered, of light green color, crisp and tender, quality good.

A. 1 (Sutton): A crisp variety with large, distinct head, very slow to go to seed; leaves large, broad, thick, blistered and crumpled, of dark green color; crisp and tender; sweet in flavor and of good quality.

Deacon: A heading variety, medium to large in size and slow to go to seed; leaves broad, smooth, thick and soft; light grayish green in color; quality good.

Onions.

The following are three of the promising new kinds among 55 varieties tested:—

Ailsa Craig (Sutton): This onion proved to be the heaviest yielder in the lot. Shape, elongated globular; very light straw color; thick skin, white crisp flesh and mild flavor.

Gibraltar: Very similar to Prizetaker, but more globular and of lighter color; does not ripen quite so early; bulbs are very tender and tops are of a lighter shade of green than most onions.

Golden Globe: Shape elongated globe; skin thin and of light golden yellow color; flesh white and mild; tops small. This variety is a desirable acquisition.

Radish.

Among 68 varieties of radishes tested, the following are a few of the promising newer kinds:—

Icicle: This is the finest and longest of the early white varieties; crisp and tender; well worthy of a trial.

White Delicious: Good size, crisp, mild, will stand in condition for some time. One of the best of the white summer radishes.

Surprise: Oval shaped, deep yellowish brown skin; flesh white and crisp.

Tomatoes.

Among the 73 varieties tested this year, the three varieties described below stand out as the most promising of the newer early kinds. The short seasons at Guelph make it impossible for us to mature full crops of the latter kinds.

Wealthy: Plant fairly vigorous and very productive, proved to be the heaviest yielder in the lot, producing 19 pounds ripe fruit per plant. Fruit medium size, round, smooth, red, firm, and good quality; early.

I. X. L. (Bolganio): Plant fairly compact and productive; season early; fruit medium in size, round, smooth, red, and fairly firm. Ranked third in yield in last year's test.

Livingston's Globe: Plant large and fairly productive; season medium to late; fruit large, round, smooth, crimson, fairly solid and attractive.

Notes by E. E. Adams, (*Essex Vegetable Station*).

The season has been a fairly good one, weather conditions being fair to good, although we had a severe drought here during August and a part of September, which prevented some vegetables from developing to their best. The work for this season was not so extensive as is desirable, from the fact that my appointment as experimenter was not made until somewhat late in the season, and after a large amount of our planting was completed.

Tomatoes: However, some work was done, and in tomatoes a good number of varieties was experimented with to show if any advantage can be had in forcing later varieties as to earliness. Some of the early varieties are not always satisfactory, and I wished to note from actual work with the later varieties, if it is possible to so handle them that they can be forced into early bearing, as well as to produce a good crop. Twenty-four varieties were planted, twelve plants of a kind, and all were given same treatment in the hot-house, viz.: Seed was sown about March 1st, transplanted three times, and set in the field about May 24th, some being set with fruit, others showing no fruit or blossoms, but all fine, large stocky plants. These were planted on ground which had been fertilized the previous spring with barn yard manure, and after planting, one ounce of nitrate of soda was applied around the plant and hoed in. The varieties used were Acme, Early Michigan, Stone, Burpee's Combination, Matchless, Chalk's Early Jewel, Royal Red, Buckeye State, First of All, Mayflower, Livingston's Beauty, Fordhook First, Earliana, Magnus, Atlantic Prize, Moore's King of the Earlies, Earlibell, Plentiful, Dwarf Champion and Quarter Century. The experiment showed that the later varieties will not produce early, that the crop is decidedly smaller, that the size of the fruit is much smaller than when grown as a later crop. Burpee's Earliest Pink was also tried, but I can see no advantage in growing it above the varieties in general use. It sets a lot of fruit, but the size does not hold up well into the season. The quality is very good however. The earliest varieties are Earliana, Earlibell, Earliest Pink, Atlantic Prize and First of All; second early, Magnus, Champion, or Century, Fordhook First, Beauty, Early Jewel; and the later varieties are, Matchless Stone, Royal Red, Plentiful and Buckeye State. Most all these do very well on our sandy soil, but Champion and Buckeye State should, I think, have a heavier soil to produce paying crops.

For Early Peppers: I would recommend the Long Cardinal and Neapolitan, and for later the Chinese Giant, although there are several others that give good results, viz.: Sweet Mountain, Ruby Giant, Ohio Crimson, etc.

For Early Cabbage: The Extra Early Jersey Wakefield appears to give the best results, although Johnson and Stoke's Extra Early is somewhat earlier, and some growers prefer it. It is a cabbage of fine quality, pointed head, very sweet, crisp and tender, and where the true seed can be procured it will turn off a very nice crop. I find true seed hard to get, and as such is the case, not a very large quantity of it is grown now. Henderson's Early Summer, Early Spring and All Head are also good early varieties, but for

an early crop of even size heads, I know of none better than the Early Jersey Wakefield for our soil.

Cucumbers: Several varieties of cucumbers have been tested, but I find the Extra Early White Spine and the Arlington White Spine are preferred here, although the Early Cyclone is a somewhat earlier variety, but not as desirable in shape, size or appearance as the Spine varieties. I have used Perfection Hot House, a selection of the Spine varieties, for hot-house work this season, and for color, productiveness and general good qualities, I much prefer it to any other variety so far used. The Extra Early White Spine did not show up so well this year as in 1905, but the Evergreen was, as usual, good. It is a satisfactory cucumber, both for inside and outside work.

Squashes: Green and Red Hubbard squashes are the best grown with us, while the Large Field is the larger. Other varieties will be tested next season.

Onions: The best varieties of onions appear to be Giant Rocca, Prizetaker, Danvers, Red Globe, Wethersfield, Mammoth Pompeii and Giant of Gibralter. The Yellow Globe, Danvers, Red Globe and Red Wethersfield are the best keepers and shippers, the Danvers being the favorite perhaps more on account of its color than any preference in quality. Extra Early Red is grown for first crop. It is of fair size and ripens up early, and can be marketed in August generally.

Carrots: Improved Short White appears to be the best White Carrot, while Chantenay and Danvers are the favorite red varieties.

Celery: White Plume celery is the main early variety, and Winter Queen, Giant Pascal, Golden Self Blanching and Golden Heart are preferred here, although Perfection, Heartwell and Perle le Grande are excellent varieties. Some varieties do well on certain soils, and on other soils are a failure, so growers should test for themselves to see which variety will best suit their purpose.

Potatoes: There being so many good potatoes now on the market, it is a hard matter to just say positively which is the best, but for extra early, on good soil, the Early Ohio is the earliest and best cropper of good sized tubers. While in this district they are not largely grown, yet on good soil they do well. Burpee's Extra Early and Bovee are the favorites here, although Sensation is coming to the front, and Mills' Early First Market will likely make a place for itself, as it is a very fine early variety.

Corn: Mammoth White Cob Cory corn is the favorite early market corn here, but is not of the best quality for early, and Country Gentleman and Stowell's Evergreen for later.

Beans: Wardwell's Kidney Wax Beans and Golden Wax are the best early yellow podded varieties, and Stringless Green Pod for green pods. The Green podded varieties do not sell well in market on account of poor color, but where known, they sell well, the quality being very desirable.

Muskmelons: The muskmelons or cantaloupes which do best here are Extra Early Hackensack, Long Island Beauty, Osage, Paul Rose, Emerald Gem, Rocky Ford, and Defender. The Hackensack and Beauty are not of the finest quality, but grow to good size, and are the general favorites in the markets. The other varieties named are much the best in quality, especially the Emerald Gems. Their flesh is salmon color, and when fully matured are of the highest quality.

Sweet Potatoes: Jersey Sweet and Yellow Nansemond Sweet potatoes are the varieties grown here, but the Jersey Sweets are much the better in quality, but not as heavy producers.

Watermelons: Halbert Honey watermelon is about the best for home use, while Kleckley Sweets are about equal to them. Peerless and Fordhook Early are also good early varieties, and do well here on sandy soil.

Next season I trust to be able to show progress on other lines which have not been taken up this year.

Descriptions of Varieties Tested.

Prizetaker Onion: Very large, nearly globe shaped, with skin of red straw color, measuring from 12 to 18 inches in circumference; ripens up hard and fine, and presents the handsomest possible appearance, the flesh is pure white, fine grained, mild and delicate in flavor; excellent for fall and early winter.

Giant of Gibraltar Onion: Similar in every way to Prizetaker, but larger.

Mammoth Green Squash: Largest squash grown; has been grown to 400 pounds under special culture for exhibition purposes; skin dark green, flesh golden yellow; mostly fed to cattle; quality not good enough for table use.

Red Hubbard Squash: Identical in form and quality with the well known Hubbard squash, except that the heavily warted skin is of a beautiful bright red color; flesh, deep golden yellow, fine grained; cooks dry, and is of the finest flavor.

White Cushaw Pumpkin: Similar in appearance to the Japanese Pie pumpkin, with the exception that the skin is white; flesh of very fine quality.

Halbert Honey Watermelon: The finest watermelon for the home garden and for nearby markets; size averages 18 to 20 inches long; skin dark glossy green; flesh, a beautiful crimson; very desirable.

Neapolitan Pepper: The earliest mild red pepper, and the most productive; fruit, measures 4 inches in length by 4½ inches in circumference. The skin and flesh are bright red; they are thick meated, sweet and very mild, and keep in good condition a long time.

Long Cardinal Pepper: The earliest pickling pepper; about 6 to 7 inches long; very hot; a very heavy bearer.

Rose of the North Potato: A very early, fine quality potato; a good keeper; cropper; rose color; fine shape.

Burpee's Extra Early Potato: The finest in quality of all early potatoes, and the earliest variety of good size; oblong shape; very pale brownish skin; few eyes; very productive.

Vermont Gold Coin Potato: Strong grower; luxuriant deep green foliage; tubers good size; set closely in hill; skin thin, smooth and glossy, of a light golden tint; flesh, fine grained, of a pure pearly whiteness. A fine potato for main crop.

Carrot, Chatenay (stump rooted): Splendid shape; fine deep scarlet color; roots of the finest quality.

Carrot, Early Gem (Oxheart or Geurande): Much thicker than the Early Horn; quality excellent, and is almost coreless.

Carrot, Improved Short White: Roots extra large, half long, smooth, tapering to a point, measuring 12 to 18 inches in length, and from 16 to 20 inches around the top; flesh solid and crisp, rich pearl white color; a very heavy cropper and the easiest carrot to harvest.

Pop Corn, Queen's Golden: Produces abundantly, pops perfectly white and is of very fine quality.

Tomato, Sparks' Earliana: The earliest red, smooth tomato, of good size; quite uniform in size, averaging three inches in diameter, and from two to two and a half inches deep; quality good.

Tomato, June Pink: Ripens just as early as Earliana, foliage quite similar; handsome deep pink in color; not as valuable as Earliana.

Tomato, Chalk's Early Jewel: A mid season variety, perfectly smooth; color, bright scarlet, ripening right up to the stem, without cracks or green core; flesh very solid, meaty, very few seeds; skin thin, in fact too thin to make it a good shipper, still it is fine for nearby markets.

SECOND ANNUAL REPORT

OF THE

Ontario Vegetable Growers' Association

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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To the Honorable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honor:

I have the pleasure to present herewith for the consideration of your Honor the Report of the Ontario Vegetable Growers' Association for 1906.

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1907.

Ontario Vegetable Growers' Association

REPORT OF THE SECRETARY-TREASURER.

The following is a copy of a brief report of the year's work of the Association as mailed by the secretary-treasurer to the branch Associations, for consideration at their annual meetings held during the first week in December:

On behalf of the Directors of the Ontario Vegetable Growers' Association, I beg to report that during the year ending November 30th, 1906, the Association has been able to accomplish much valuable work for the vegetable growers of the Province. New branches have been formed at Ottawa, Kingston, Tecumseh, Brantford and Scotland. The Association has now ten branches, with a total membership of 509, composed as follows:—Toronto, 200; Hamilton, 81; Ottawa, 39; St. Catharines, 29; Sarnia, 29; Kingston, 27; Scotland, 26; Chatham, 26; Brantford, 16; Tecumseh, 16; odd members, 20. Although the youngest, it is now the strongest and most representative organization of the kind in the Province.

During the year 1906, meetings of the full Board of Directors were held on February 7th, March 15th, June 21st, and November 7th, and meetings of the executive committee on March 8th, May 22nd and Sept. 22nd. Early in the year your Board of Directors approached the Hon. Mr. Monteith, Minister of Agriculture, and urged that an expert vegetable grower should be appointed to the staff of the Guelph Agricultural College, and also that a representative grower should be sent to visit the Northern States for the purpose of seeing what work is being attempted in those States for the benefit of the vegetable growers. Both requests were granted, Mr. McMeans, of Brantford, being appointed to the staff of the College at Guelph, and later sent on a trip to the States. A description of the main points of interest to vegetable growers observed by him during his trip was published in the official organ of the Association.

Early in the year a committee from your Association waited on the Dominion Government at Ottawa and urged the appointment of an appraiser, whose duty it would be to place a valuation on the vegetables imported into Canada. Owing to the fact that the revision of the tariff was under consideration by the Government, no definite answer was given to this request. Little hope was held out that an appraiser would be appointed, but it was intimated that a specific duty might be granted. At a meeting of the Board of Directors held March 15th, 1905, the revision of the constitution was given careful consideration. A number of changes were made in the constitution.

(*Note.*—The constitution as amended is here published).

In compliance with a request received from the Ottawa branch, information was obtained early in the summer in regard to the by-laws that are in force in the various cities throughout Ontario concerning the hours for selling vegetables. This information was compiled and supplied to the various branches.

The various branch Associations having reported in favor of the Ontario Association issuing monthly crop reports on the vegetable crop conditions throughout the Province, arrangements for the publication of such reports were made early in the year. These reports have been published in full in the official organ of the Association, and summaries of the reports were sent monthly to the leading papers throughout the Province. This line of work has met with general approval on the part of the members of the Association.

During the summer it was decided to offer $125 in prizes for essays on the growing of potatoes, cauliflower, celery, tomatoes, and onions. This competition aroused considerable interest, and led to a number of essays being submitted. The prize winning essays were read at the anual convention held early in November in Toronto, and will be published in the next annual report of the Association.

With the idea of ascertaining what work is being carried on at the Guelph Agricultural College and at the Central Experimental Farm at Ottawa for the benefit of vegetable growers, committees were appointed to visit these institutions. The committees were instructed, not only to find what work is being done, but to make suggestions for new lines of work. Reports of these committees were presented at the meeting of the Board of Directors, held in Toronto, November 7th. No action was taken in regard to the report presented by the committee who visited the Central Experimental Farm at Ottawa. The committee who visited the Ontario Agricultural College at Guelph reported that but little work of value to vegetable growers was being conducted there, that the representative of the vegetable growers on the staff was not being given an opportunity to carry on the line of work that the Association desired, and that there seemed to be a lack of harmony between the heads of the different departments. Credit was given to the College for certain valuable bulletins that have been issued and for experiments in the growing of potatoes, and for certain other lines of work. Your Board felt that the matter was of importance, and later had an interview with the Hon. Mr. Monteith and urged that more attention be given to the growing of vegetables at the Guelph Agricultural College, and that the representative of the vegetable growers should be given a freer hand. At the same time the request was made that the grant to the Association should be increased from $600 to $1,000. The report of the committee was left in the hands of the Hon. Mr. Monteith. Since that date Mr. Monteith has written your Board stating that the matters urged by the vegetable growers had been brought to the attention of President Creelman of the College, and that in every way possible the desires of the vegetable growers of the Province would be acceded to.

During the year your Board has purchased bulletins on vegetable growing from the Vermont and Michigan Experimental Stations, and copies of the bulletins were mailed to all the members of the Association. It is the intention of your directors to purchase such bulletins, issued by the various experimental stations, as they think will be of value to the members of the Association.

The desire having been expressed that copies of the constitution should be printed in French, this was done. It is anticipated that branch associations will be formed at Windsor and in other sections where there are a large number of French vegetable growers.

During the year your Board co-operated with the Board of the Ontario Fruit Growers' Association and other organizations in the holding of the Ontario Horticultural Exhibition at Toronto, from November 6th to 10th.

Over $300 was offered in prizes for vegetables. The competition in almost every class was keen, and it was generally admitted that this was the finest exhibition of vegetables ever held in Canada.

At the time of the holding of this exhibition the annual convention of your Association was held, at which speakers were present from outside points. Much interest was taken in the various sessions, a full report of which will appear in the next annual report of the Association.

During the summer many of the branch associations have conducted work of much value to their branches, including the purchase of supplies and the holding of regular meetings for the discussion of matters pertaining to vegetable growing.

Arrangements are being made by your Board of Directors for the holding of a series of meetings by the various branches, for which meetings speakers will be furnished free of cost by the Farmers' Institutes.

Enclosed you will find a statement showing the receipts and expenditures of the Association to date, with the balance on hand.

Respectfully submitted,

H. B. Cowan,
Secretary-Treasurer.

FINANCIAL STATEMENT.

Receipts.

Government grant	$600 00	
Balance on hand, December 1st, 1905	498 27	
Membership fees	257 10	
Entry fees, Ontario Horticultural Exhibition, 1905...	37 95	
Interest	1 00	
		$1,394 32

Expenditures.

Ontario Horticultural Exhibition, 1905	$165 00	
Ontario Horticultural Exhibition, 1906	150 00	
Official organ	289 70	
Committee expenses	250 65	
Annual meeting, 1905	57 90	
Annual meeting, 1906	30 05	
Organization expenses	158 13	
Sundries (stamps, printing, stationery, telegrams, express, etc.)	81 80	
Membership rebates	2 85	
Purchase of bulletins	8 90	
Crop reports	29 85	
Prizes for essays	107 90	
		$1,332 73
Balance on hand, Dec., 1906		61 59
		$1,394 32

Signed,
H. B. Cowan,
Secretary-Treasurer.

Audited and found correct, P. W. Hodgetts.

SECOND ANNUAL CONVENTION.

The second annual convention of the Ontario Vegetable Growers Association was held in the City Hall, Toronto, November 8-9, 1906. The attendance was gratifying. The committee room in which the meetings were held was well filled at each of the meetings, and the interest evinced in the proceedings was marked. The president, Mr. F. F. Reeves, of Humber Bay, presided at the various sessions.

PRESIDENT'S ADDRESS.

By F. F. Reeves, Humber Bay.

In opening this second annual convention of the vegetable growers of Ontario I am not going to detain you with a speech. We can congratulate ourselves on the growth we have made during the past year. At the present our membership is 509. Branches have been established in Sarnia, St. Catharines, Brantford, Tecumseh, Kingston, Chatham, Toronto and Ottawa, and I think before the end of the year there will be one in Guelph, and I am in hopes that we will be able to form one in London. We have tried several times to get in touch with the growers around London and we are going to try again. We made an effort to organize a branch association in Napanee; a meeting was called, which I attended, but unfortunately the crowd did not turn up, and our efforts were not successful. There are seven members of the association in Napanee, and they have promised to try again this winter, and I am in hopes that we will be able to establish an organization in that place. Another place where we will make an effort to branch out is Windsor. If we want to keep the Association in its present healthy condition we will have to branch out as much as possible. We had the best directors' meeting yesterday that we have ever held. We notified the Minister of Agriculture about one or two little points, that, I think, will be adjusted.

EXPERIMENTS WITH TOMATOES.

By Geo. A. Robertson, St. Catharines.

The captain of a steamer which plied on the New England coast was once going through a narrow channel which formed the entrance to a well known harbor, when a passenger said to him, "Well, captain, I suppose you know every rock in this channel?" He replied, "I know most of them." Just then the ship ran on a rock, and he added, "There is one of them now." So with tomato growing. Success comes sometimes, all is smooth sailing, and one is about to congratulate himself on his past years' efforts, and thinks that last spring the seed came up well, the plants were well grown, the land was in good shape, they were planted out just so as to miss the last cold weather, there was no check in the growth and a good crop was the result. "At last," we say, "we have found out what to do and what not to do;" but the following year the weather conditions change, we have struck a hidden rock, and the cause is attributed to bad luck.

The subject, "Experiments with Tomatoes," may be better named "Tomato Growing," for each season's growth, with changed conditions, newer varieties, new methods of culture, the varying demands of the markets, and the introduction of new diseases will probably keep the business in the experimental stage for some years to come.

The tomato (*Lycopersecum esculentum*) is closely allied to the potato, on which vine it may be grafted. It is a native of tropical America, and is most largely grown in North America, where it has reached its highest state of perfection. The tomato has come into common use only during the last century, and is to-day one of the fruits most exclusively used for canning purposes. Being of tropical origin, we have the key to its treatment for best results, namely: Heat, and the necessary amount of moisture.

Tomatoes have many species, many of which are ornamental; but the common one with which we are dealing is divided into two classes, early and late. The late are the main crop varieties, and include the well known canning varieties, mostly all are of good quality and conform closely to the American standard, *large, globular, solid, and smooth.*

The early varieties are, as a rule, not so vigorous in growth, they bloom earlier and bear fruit earlier, and as a class the fruits are flatter, not so deep from stem to blossom end), rough or corrugated on the outside, smaller in size, and often a greenish tinge on the stem end, while the blossom end is quite ripe, but on account of their earliness command the highest price, and if given the proper care are often most profitable to grow.

When starting to grow early tomatoes, we first procure the seed, and we ask ourselves the question, "What is seed?" By the aid of a microscope we see in the seed the germ—the future plant—folded up in order. In one end of the germ are the seed leaves, while in the other we see the miniature roots. The germ is a small part of the seed, the other part consisting of various materials which, when germination takes place, are rendered soluble, and go to nourish that germ until the germ leaves above ground and the rootlets below are developed sufficiently, when, under proper conditions, the plant is able to perform its own functions. Hence the necessity for plump seed, and of strong vitality. But seed is more than this. It is a means of the perpetuation of the species, the perpetuation of the variety; and, what is more, it perpetuates, to a certain extent, the individual characteristic of the parent plant.

Several years ago this was brought prominently to my notice. I had numerous varieties under test, and came across a small packet of tomato seed named Ruby. Two rows of plants through the plot from this seed produced only a medium amount of vine and fruit unlike any "Ruby" I had ever grown, in that the fruit was so flat and rough that there was not one tomato of marketable quality, and all were much inferior to anything I have ever seen. The following season I tried Earliana. It proved fairly early, a good cropper, and of fair size, but many of the later ripening fruits were rather too irregular to compete with the later varieties. The following season I got some of the same variety of seed elsewhere. The type was much better, and I then started to carefully examine each vine. I drove stakes to mark several of the best loaded, farthest developed, most uniform sized, deepest fruited, and smoothest fruited vines, and allowed the best tomatoes to ripen. Then I washed out the seeds carefully, allowing all the small, partly developed seeds to float off with the pulp, and carefully dried the largest and plump seeds. I have followed this plan since, and now have the fourth selection. My seed vine this year had not one ill-shaped fruit, had eight and nine fruits in a cluster, smooth, clean skinned, more evenly

colored than formerly; and my entire crop has been improving while the percentage of unmarketable tomatoes is less each year.

Having thus taken care with the seed, we usually plant the end of January or the fore part of February. The seed bed should be fine in texture, fairly rich, and located in a warm and sunny spot in the green-house. Care should be given in watering; an excess of water, especially during dull weather, will cause the plants to "draw up," and the weak spindly growth, if the soil is not stirred, will often fall a prey to "damping off." When the plants show their second leaves they are pricked out in rows, two inches apart and one to two inches in a row. This process is repeated as often as necessary, widening the distance as the roots develop and the tops expand, then they may be potted into pots of suitable size; four-inch is commonly used, while some growers prefer to again shift them to six-inch pots. After the roots have got a good hold of the soil, harden the plants off in cold frames if the weather will permit, giving ample room for each plant to develop laterals. These can then be planted out as soon as the ground is warm enough, and the weather is favorable, which is usually about the time the buds on the trees are breaking forth; then they suffer no serious setbacks, and the already formed fruits continue to grow.

Next in order is the *soil*. It should be warm. A well drained soil is usually the warmest, as the excess of water runs off, while if the land is wet the heat from the sun is first used to evaporate the excess of moisture, and naturally a gravelly or sandy soil will drain most quickly.

How shall we *manure* the land? We sometimes hear that land for early tomatoes should not be too rich, this is a very indefinite statement. It is not so often a question of over richness as that of less manuring. Fresh barnyard manure, applied to the land the same spring just before planting, was followed by an excessively wet season, and an excessive growth of vine was had at the expense of early maturity. A piece of heavier poor land that for years had never had any manure, this same wet season produced a profitable crop of early tomatoes, while it never has done so in a dry season. An excessive use of nitrate of soda has produced vines at the expense of early maturity on sandy loam in good heart, while the heavier clay land has responded to the use of nitrate of soda in an increased crop. For the average season, sandy loam well manured with barnyard manure for a previous crop, then plowed and worked in the spring and manured with a good high grade phosphate (14 per cent.) at the rate of 600 to 800 lbs. to the acre, and muriate or sulphate of potash 300 lbs. to the acre, will give good results. If the plants are slow in starting, giving enough nitrate of soda to start them, but not to prolong the growth, will prove beneficial.

Late tomatoes are handled somewhat differently. The land should be in good health, and clean and rich. The seed if planted towards the end of March will give good results. The seedlings may be transplanted into hot-beds—or, rather, cold frames with about four inches of manure under —to give a little bottom heat only. The distance apart should be about four inches. A steady growth is maintained, and when danger of frost is over they may be transplanted directly into the field, planting about five feet apart each way. The same general cultivation for both early and late is constant stirring of the soil by a horse hoe or scuffler, deeper at first, gradually getting shallower when growth of vines will make work among them impossible. As a crop is the main object, late tomatoes usually respond to the application of nitrate of soda by an increased yield. If the ground is not already rich in nitrogen, phosphoric acid and potash are the fruit-producing constituents most necessary.

There are a great many drawbacks to tomato culture. A very common one in early tomato culture is sun scald, or hardening of that portion of the fruit most exposed to the sun's rays. A blight most destructive in the South kills the vines quickly. This is due to a bacillus, or germ, not common in this section. Then there is another form, supposed to be a mildew, which wilts the leaves from the bottom of the vines up. But by far the most destructive and most common the last season was the "Tomato Rot," or "Blossom End Rot," when the fruit turns black and rotten at the blossom end before ripening. It is sometimes caused by an excessive growth of vine to start off with, then a sudden check by drouth, or by lack of plant food which makes the fruit most subject to rot. The best rememdy is prevention, by having a fresh piece of land each year to grow the crop, and so changing of the earth each year in which the plants are grown, and avoiding these conditions which predispose the crop to rot.

Lastly, in fruit and vegetable culture, it is not what we grow but what we market successfully that pays; and the utmost care should be taken in the selection of the variety or the strain. Among the late tomatoes, some varieties are much later than others, and a week's difference in ripening may save a few hundred bushels from frost. It is needless to mention varieties, as each grower has his favorite. That somewhat newer variety "Success" has given me good satisfaction on account of its comparative earliness and good qualities.

Mr. J. Rush: Would an application of nitrate of soda about three weeks before the tomatoes were ripened do away with the sun scald on the early fruit? I think that would make a little extra growth of leaf.

Mr. Robertson: Unless you put the leaves over the fruit to protect it, I do not think it would have the desired effect. We have not time to do it at that season of the year, because we have the cherries to pick. If I had nothing else to do but grow tomatoes I would try a number of experiments to find out what would help in matters of this kind.

A Member: What amount of nitrate of soda do you use around these plants?

Mr. Robertson: I was going to say a thimble full to a plant would be a pretty fair application, it depends on the soil.

Q.—Sandy soil?

A.—Yes, manured, with barnyard manure the previous season, and there might have been some of it left in there, and it will give up its nitrogen as it decays. I sometimes use a fertilizer with a little nitrogen. I want it in such soluble form that the leaf growth will stop and the vine will produce its fruit. I want to get a crop of early fruit, and, therefore, I avoid the excessive use of nitrogen. I would put a great deal more nitrate of soda in there so that the plant will stop growth and start growing fruit.

Q.—Did you ever try an application of nitrate of soda?

A.—I would if I were growing a late tomato, but I prefer to handle it cautiously. It is like a medicine. You can have your land so lacking in vegetable matter that an application of these mineral fertilizers is practically wasted on the land, except under very favourable weather conditions. In other words, to pour food down a man's neck is not of any use to him unless his stomach is in working order, and he can make use of it. It is not what we eat, but what we digest.

Mr. Adams, Leamington: You mean that this blight that comes on the vine may be perpetuated from year to year by using the same ground?

A.—Yes, that has been the bugaboo of tomato culture in the south. In our district we are thoroughly up-to-date in controlling insect and fungous diseases. We seem to get them first, and we have to understand them.

The CHAIRMAN: Do you think that if you changed your land that you could check, to a certain extent, that dry, black blossom rot?

A.—I would not say that. I know it is a fungous disease. If we leave any rotten tomatoes on the land, a fungous disease will reproduce itself. I do not say that it will get rid of it, but it is a preventive measure. You will harvest more tomatoes off fresh land.

Mr. F. F. REEVES: I planted about a half acre of tomatoes on a piece of land that I did not have tomatoes on before; it was sod last year, and we had a great deal of black rot. It was plowed twice and disked over, and I had that black rot there, and it almost destroyed my crop.

Mr. ROBERTSON: Bailey gives as the cause of excessive rot the excessive growth of vine and damp weather. If the land is heavy there is excessive growth of vine.

Mr. F. F. REEVES: It was not the dampness in this case.

Mr. ROBERTSON: In our section they say that it is the dryness that causes this.

Mr. F. COLLINS, Chatham: Don't you think the season might affect that?

Mr. J. RUSH: I think it is very similar to tomatoes in the greenhouse. I have an idea that the disease is reproduced from year to year. Three years ago we had the same result all over the country. There was something the matter with the seed that was sent out by the seedsmen.

Mr. ADAMS: Don't some varieties rot more quickly than others?

Mr. ROBERTSON: Yes, Ignotum. I would not grow it if you gave me the seed. The canners around our section favor Success. I favor it myself, because it is a little earlier in ripening. I had a good show bird, but it was the poorest layer in the flock. I set some of her eggs and raised chickens, and they were poor layers. Chickens from good layers made money for me, but I believe we are only touching the fringe of the benefit of selection of seed in vegetable growing. I think that many of the varieties which we see on the seed growers catalogue are only separate varieties on the pages of that catalogue. They are just certain different strains which vary a little from the same type.

Mr. F. F. REEVES: Talking about seed selection, I noticed when I was over at St. Catharines at your place that your Earlianas were the brightest fruit I had ever seen; they were plump and deep and ripe all the way around.

Mr. ROBERTSON: I noticed an article written by Mr. Raynor, of the Seed Branch of the Department of Agriculture at Ottawa, on that subject, and it is a little bit overdrawn in one thing, in that he said that I have got a permanent strain. I have an improved strain. I have saved seed from my best vines. I had several vines staked out, but I saved seed from only one vine. One gentlemen took some of these seeds, and I asked him to get a couple of samples of the original " 'Anas," and Mr. Clark sent for them, and that is how I am responsible for that article. I have had numerous letters asking for seed, but I have not any seed except a little for myself.

Mr. T. DELWORTH, Weston: Some varieties of tomatoes seem to be more susceptible to the rot. I found Chalk's Early Jewels are the best. We have had a little rot in it, but not so much as I have found in other tomatoes. I find they have good shape and good color.

Mr. Robertson: When I first started growing asparagus we had no trouble, but now we have all kinds of beetles, and I do not know how many kinds of fungous diseases.

Mr. Bushel, Kingston: The asparagus beetle comes every year, but it does not come with the seed.

Mr. J. Rush: I knew a man who could grow tomatoes with very little vine, but he suffered from sun-scald. The first crop of tomatoes are planted 3 feet 6 inches each way, and do not begin to cover the ground, and he has plenty of fruit. I think it would have paid him to have his tomatoes covered with umbrellas. I must tell you a little experience I had some years ago with the Imperial. It was a very fine tomato for three or four years. I had an acre of onions that were 8 inches high, and one morning they all turned yellow, and I had them plowed up. I buried two rows of onions, and left a deep furrow between the rows. This was about June 20th. I had raised a lot of Imperial tomato plants for a man, and he did not come for them. I had about 4,000 plants 3 feet 6 inches long, and we took them up to this land on June 20th, and laid them down in the deep furrows, and I never saw anything go along like them; the crop beat anything I had ever seen. A canning firm in Owen Sound sent down to see if I could fill a car, and I picked 580 bushels in a week. We would almost get a bushel from 4 plants. Next year I said, that is the tomato for me, and I saved my own seed from my selected tomatoes and planted them, and 2-3 of them had black rot; they were planted on the same kind of soil.

GROWING TOMATOES UNDER GLASS.

By C. Gibbard, Todmorden.

In this work, the first thing a person wants to think of is the kind of tomato to grow. There is no use getting late tomatoes to grow in a greenhouse. I have tried it. I have been told that the Stone was a good tomato to grow in a greenhouse. It is very nice, what you get of it, but it is too slow, and takes too long to ripen, and there is not enough fruit on it. Last year I tried Chalk's Early Jewel. It is a nice tomato and a fair cropper, but I do not think it is as heavy as the Earliana and Earliest of All. I think they are the two best tomatoes for growing in the greenhouse. Last year I grew all Earliana, with the exception of a few of Chalk's Jewel.

Mr. T. Delworth: What class of Earliest of All did you get?

A.—What we have had we got from The Steele-Briggs Seed Company, but I do not like it because it is not smooth enough. Mr. Westwood grows Earliest of All. He has a good strain and always saves his own seed. For growing tomatoes in the greenhouse, what we want is not something that will give us a few really choice tomatoes, but something that will give us a good, big crop. It may be all right for some one who is growing them as a hobby, and who is satisfied to get some choice tomatoes, but we want a good paying crop. We must arrange our crop so as to interfere as little as possible with the growing of lettuce and radishes in the winter. In preparing the ground for tomatoes, I do not make any special preparation of it. The fall before I start my greenhouse I put on a heavy coating of well rotted manure. I do not think fresh manure is any good.

Mr. Collins: Do you grow the tomatoes on benches?

A.—We have ground beds. If you think of growing tomatoes on benches I do not know anything about it. I have tried it and failed completely. I plant my lettuce and radishes and grow them through the winter until we are ready to plant the spring crop of tomatoes. The time to sow your seed is very important. It is something we have got to find out for ourselves. If you have a warm house your tomatoes will come along faster. It depends a great deal on the soil. You have to find out for yourself what time to sow your seed. I sowed my first seed about the second week in January last year, and I followed it two weeks later with another box. I sowed the seed in flats two weeks later, and I put in another, and the tomatoes came along at three different times. You will find out the importance of that when you begin to plant out your beds. When the plants get big enough to handle easily I set them in flats. I set them out about three inches apart, and leave them there until they begin to grow, and then I move them. Have your beds ready to set them into. I put them in pots or berry boxes. This takes up a little room in your house, but you will find that it will pay.

I like to get a good strong vigorous plant, and do not like a long spindly plant at all. While the plants are in the boxes, in the flats, or in the pots be very careful in watering. If you have them in flats, or in shelves you are very apt to water one side of the box and leave the other side dry, or one box will get a heavy dose of water and another get very little. That is something you need to be very careful about, because if you allow the plant to dry out and get checked and stunted you will have a very poor crop of tomatoes. I would commence planting my beds about the second week in March; I think about March 20th. The beds are about six feet wide, and I put five plants in a row across the beds and the rows two feet apart. I find that gives plenty of room for the tomatoes and gives me room to grow a double row of lettuce between the tomatoes, and that will give you a crop of lettuce while your tomatoes are growing. The lettuce should come off before the tomatoes are far enough advanced to be injured by them. When the lettuce is off you will find your tomatoes need attention; and it will pay for the attention you give it. If they are neglected at all you are sure to loose. You will find that they need trimming and stalking up by the time the lettuce is off. We had wires along the roof of the greenhouse, and then strings from that to the bottom of the plant, and we wound the plant up the string. That was a good plan, but I found that it was too heavy on the roof of the house, and I have taken these strings down, and I am using laths instead. The laths are a little more trouble, but they are easier on the house. I put a four foot lath on each plant and tied them up to that, and I picked off all side shoots, and only allowed the main shoot to grow. Some growers like to allow a couple of shoots to grow, but I think it is better not to do so. A man I know, attempted to grow tomatoes, and he put them in a pail underneath a bench and cut a hole in the bottom of the bench and ran the tomatoes up through. He did not get any tomatoes. Another man planted them about seven inches apart all over the bed, and let a couple of vines grow. He said if you had them any thinner you could not get any off, but he did not get any off them. But these two men are now the two best growers of tomatoes around Toronto. They grow the best tomatoes and the most of them, so far as I know.

In growing tomatoes you will find it important to have three different sowings of seed. Of course when you are growing lettuce all the time and radishes it will be some trouble before you get the plants all planted out.

Some of them will be so big that you will have to hold them back, and they never do as well after they have been checked.

I do not like to plant them when they are too far advanced; I like to see them just budding for flowers when they are planted out. If you have two bunches of flowers on the plant when you are setting them out you are likely to loose one of the bunches if your first lot of plants are getting too far forward. I would prefer to throw them out; it does not look nice to do so but it will pay you. A small plant that has been growing steady is better than a good big plant that has been held back. After you start trimming you should watch them carefully and keep the side shoots well picked off, and do not let them get too big. You will find that in good growing weather it will keep you going over them pretty well. As soon as the side shoot gets up to the top of the lath, pick it off, and you will have no more vine growth, and the growth will all go into your tomatoes. When you water give them good water. I do not like going over them every day and giving them a sprinkle, I give them a good watering when I do give them any. Of course you can overdo it. But give them a good watering, and do not give them any more until they need it. When the fruit is setting the house needs to be kept as dry as possible. A damp house will interfere with the setting of the fruit.

Mr. Delworth: Are the paths sunk between these beds, or are they on the level?

A.—I have a twelve inch board for a path, and the bed is raised up to the level of that. The path is about ten inches lower than the soil. I like to keep the bed a little below the top of the board.

Mr. Delworth: The soil is naturally damp?

A.—Yes.

Mr. Delworth: What drainage have you?

A.—We have nothing at all, and that is just where we are lacking.

Q.—What is your sub-soil?

A.—Quicksand, the conditions are very poor for growing tomatoes; it has too poor a bottom.

Q.—You have quicksand sub-soil?

A.—Yes.

Q.—And the soil on top of that would be loam?

A.—Yes, quite a sandy loam.

Mr. Rush: The path would act as a drain?

A.—Yes, it drains the bed to a certain extent. Of course, in wet weather in the spring the water gets right up to the path, and it makes it bad for the tomatoes. I believe if you had a place which you could drain well it would give the tomatoes a far better chance. If the house is allowed to get damp it helps along the mildew.

Mr. Delworth: What do you put on for the mildew?

A.—That is just what I would like to know; we use sulphur. It checks it, but I do not know how to cure it. When the mildew once gets in the best thing you can do is to shove your crop for all it is worth.

Mr. Delworth: I think where you are heating by steam you get your pipes very much warmer than you do with water. If you heat by steam, I think the sulphur on the pipes will have a considerable effect in checking the mildew. And another thing that might check it would be to sprinkle a little sulphur right on the plant.

Mr. Rush: That would check the growth too?

A.—It might do that too. If you are going to grow tomatoes you should keep your house pretty warm to get the best results from them. I

think the lowest temperature at night should be about 60 degrees. The house should not go below that; and in the day time you should ventilate when you get above 75 degrees. You can go to 85 and 90 degrees; it won't hurt them; but it is well to ventilate when you get above 75 degrees.

Mr. DELWORTH: What system of ventilation have you?

A.—Just Reid's ventilators. When the tomatoes are seeding, I find they need feeding. Tomatoes will stand a lot of feeding. You will find that you will have a job to give them too much. We have used nitrate of soda considerably, but what we like best is good manure water; that is the best food I have used. It will force them along, and if you give them a pretty good dose of manure water once a week it will force them better than anything I know of, and a good dressing of good rotten manure on top of the ground will help them considerably.

Mr. A. MCMEANS: What do you do for pollenization?

A.—I have not used anything.

Q.—Would not side ventilation pollenize better?

A.—I think it would.

Mr. GIBBARD, sr.: There is always plenty of fruit seed for summer pollenization, but in winter you want to pollenize.

Mr. DELWORTH: Opening the ventilators will assist in pollenizing. If you want to grow tomatoes you must keep your fires going into the spring. Last year we kept our fires going into middle of June. We could not stop before without injuring our crop. Keep your fires going, and keep your ventilators open and it will keep back the mildew.

Mr. F. F. REEVES: When do you start the harvest?

A.—If the house is kept in proper condition, about the first of June. I heard one man say he liked to get the tomato plants good and big, and then hoe them before he plants them into beds. He says he can get his fruit earlier, and so he can, but he won't get anything like as much of it. I like to see the tomatoes set and well grown up to the top of the plant before they start to ripen. As soon as the tomatoes start to ripen your growth is considerably retarded.

Mr. MCMEANS: Are you troubled with the white fly?

A.—Yes. I do not know that they have done much harm. The green fly gives us more trouble than the white fly. If you do not keep your house smoked after you have done cutting lettuce, you will find that the green fly will injure the lettuce.

The CHAIRMAN: Your experience with the fertilizer has been that the liquid manure gives you larger and better results than any chemical fertilizer you have used?

A.—Yes.

Mr. MCMEANS: Have you any preference in liquid manure?

A.—I do not know; what I have used has been from the stable. We had one cow.

Mr. MCMEANS: Do you use your compost heap and pour water on it, and drain it off for your liquid manure?

A.—The manure pile is in a hollow, and there was so much rain it kept us supplied with manure water.

Mr. ROBERTSON: When your plants are planted out how far are they apart?

A.—Sometimes they will catch up to one another. I have found they would follow on pretty well; they catch up as the weather gets warmer. Last year we finished planting on the 27th of April. The very best yield of

tomatoes we have had are from those planted some time in March. If you can get them all planted in March, I think you would have a better crop.

Q.—About what time do you start marketing?

A.—About the 9th of June.

Mr. F. F. Reeves: In planting out do you plant from each of these lots to give you a succession of fruit?

A.—No, it is just so as to have the plants in proper condition. We do not want any succession of fruit. We want them all off as early as we can get them. You will find that the second and third sowing of seed will give you your fruit quicker than a plant that has been held back.

Mr. J. Rush: They do not make as rapid growth inside as they would outside?

A.—It is about 90 days before you have ripe fruit. Almost anything will make more rapid growth outside.

A Member: I do not see the advantage of forcing?

A.—We get 15c. a pound for our tomatoes; that is the advantage of forcing.

Mr. E. E. Adams: If you expended the same amount of energy and money on the outside growth, would you not have more money at the finish?

A.—No, I do not think so.

Mr. F. F. Reeves: You have not so much work at that time of the year?

A.—The bulk of our work comes in the busy time. If a man has very much out-door work to do he has to be very careful how he goes into glass culture; if you neglect the glass you are better out of it.

Mr. Delworth: Unless you follow under-glass-crops right out to their conclusion, and work your house as many months as you can work it, there is no profit. I have never been successful with tomatoes, but I have grown cucumbers.

Mr. Gibbard: We have ten acres of work outside, and we have all we can do.

Mr. J. Rush: You say you plant five plants in six feet. What about the plant that is close to the eaves?

A.—My side beds are not so wide and the sills in our house are very low at the sides, and we have put a short lath in. Last year we ran a plant up on the next row. The only trouble was the first bunch was on the ground, and some of them were injured a little.

Mr. J. Rush: I always incline my laths, I do not run them perpendicular.

A.—You can do that if you like; we run ours perpendicular. (Applause.)

FORCING GRAND RAPIDS LETTUCE UNDER GLASS.

By Eugene Davis, Grand Rapids, Michigan.

The soil mostly used in this section is a fine, light sand, finely manured. It gives good drainage, and never gets hard. Use the best seed obtainable. It should be water cleaned which gives a plump heavy seed, and a more uniform crop. Ventilation should be given at all times when weather permits, but it is well to let cold winds blow directly on the plant.

Watering requires considerable judgment, especially during dull cloudy weather. It is better to water in bright clear weather, and in the forenoon if possible, so the plants will dry off by night. Always water thoroughly when needed. It needs water when the soil taken in the hand will not pack but crumble.

For aphis or green fly, fumigate twice a week with tobacco stems, or use tobacco dust sprinkled on plants and ground. Use after each watering until plants are one-third grown; if put on full grown plants it is very difficult to wash off. It is better also not to fumigate when the crop is nearly ready to sell, as it will smell and taste of the tobacco. We carry a night temperature of 45 to 50 degrees, day 60 to 75 degrees. We have a self-registering thermometer and thermostat, with electric bell in dwelling house. It pays, as some firemen are careless about keeping an even temperature at nights. We get better results in starting the seed bed under glass, even in August when seed is sown for first crop.

Plants are not so apt to get brown rooted or rusty, with which there has been very much trouble here, in the past three years. The rust is known locally as "shot-hole" rust, as the leaves are eaten full of holes. The crop is often completely ruined. The Michigan Experiment Station at Lansing will issue a bulletin this winter telling all that is known about this disease. For fertilizers livery stable manure, partly rotted, or in a short condition, is used. If run through a manure spreader it is in fine condition to mix with the soil. My houses are 29 by 280 feet, with double doors in each end, so that the soil and manure can be drawn in with a team and wagon. In preparing for a crop, two inches of the top soil is shovelled one side, then four inches of manure is evenly spread; then with a horse and plow is thoroughly mixed, leveled off, well watered, and top soil replaced. Eight inch boards are used for walks, which practically gives all the space for the crop. This is all th fertilizer used for the three crops usually grown during the season. It is planted in rows six inches each way, with double rooted plants six weeks old. The crop is usually ready for market in seven to eight weeks. It is sold by the pound, and packed in sugar barrels and bushel baskets paper lined. Competition is keen, and prices vary. They usually average 8 to 12 cents a pound for the season. For the past three years, instead of changing the soil, we have sterilized it with steam. It is less work, renews the soil, makes the crop grow faster, prevents damping off, kills weeds and insects, and I think it will pay any one who is having trouble in growing lettuce to try it.

The CHAIRMAN: There is one point there; sterilizing the soil.

Mr. MCMEANS: They all sterilize in Boston. When I was there I saw them doing it. They use a big box and they get a temperature of 212 degrees; but now they use an adjustment something like a harrow, and have a pipe about twelve inches long, and it is connected on the top with a pipe that is connected with the steam boiler. It is plunged into the soil, and is left there about an hour with the steam turned on all the time, and they tell me it makes a week's difference in the growth of the lettuce, having the soil sterilized.

Mr. DELWORTH: I think these men at Grand Rapids are using the same system as they do at Montreal. They produce a different lettuce to what we do. Just outside of Montreal they grow it in about the same system. They get lettuce about sixteen inches high, and they grow a head of lettuce that would weigh several pounds. They have a house 200 feet long. Mr. Garry told me he was getting 80c. a dozen, and we were selling our lettuce at the same time for 20c. a dozen.

Mr. McMeans: I always grow my lettuce about six inches apart, and I always sell it for 75c. and 80c. a dozen, when it would be selling in Toronto for 30c. It takes two weeks longer to get it there, but we are getting three times the price, and can get three crops in a season.

Mr. Delworth: I can back up what Mr. McMeans says about lettuce Mr. R. McRoberts was handling lettuce that came from Brantford from Mr. McMeans, and he was selling it here in Toronto for 75c. and 80c. a dozen, and I was offering my own for 25c.

Mr. Rush: Mr. Cole, of London, produces fine lettuce, and it is sold at 80c. a dozen. Twelve dozen fill a big sugar barrel.

Mr. Bushel: That is a matter that ought to be dealt with, the size of a bunch of lettuce. Our people in Kingston saw lettuce advertised for 20c. in Toronto, and we were charging 50c., and in order to satisfy these people I wrote to White & Co., of Toronto, to send me down a dozen of lettuce and a dozen of parsley and it took four bunches to make one of ours, and I could not give it away. I thus showed the people that we were not thieves in Kingston, and I think there should be some regulation that a bunch should be a certain size.

A Member: This Grand Rapids lettuce is the result of fourteen years selection of Black Seeded Simpson.

Mr. McMeans: The best lettuce grown in America is grown near Boston, and their houses are fifteen feet high on the ridge, and the lettuce is planted on the ground.

Mr. Delworth: In Montreal their houses are over fifteen feet high.

Mr. McMeans: I built a house some years ago on the ground; it was about fifteen feet at the ridge. I could not produce as good lettuce on the south side of that house where it is near the glass as I can in the middle, and never could.

FERTILIZERS IN RELATION TO VEGETABLE GROWING.

By Prof. R. Harcourt, O.A.C., Guelph.

I hardly knew what to take up at this meeting, and, therefore, have not prepared a special paper, because I thought I might happen to get away altogether from the line of work most wanted. I am, therefore, going to talk on the subject and allow you full permission to break in and ask questions whenever you like.

First, I will say something with reference to the plant and the soil and then I will speak with regard to fertilizers, and their relation to the plant. We should bear in mind that, in dealing with the young plant, we are dealing with something that needs everything, practically, that the young animal requires. The seed contains within itself the food for the young plants. Just as it starts out for itself, after the food in the seed is used up, and just as it begins to feel out for food from the soil, is the critical time with a great many plants. At that time the plant requires moisture, air and sunshine, food and warmth, just the same things that a young animal requires. The plant breathes and has respiration. It will give off carbon dioxid just the same as an animal. It has not the same power of getting its food that an animal has. The animal can hunt around for its food; the plant cannot change its position. The plant has no way of calling attention to its needs as the animal has other than by

its appearance. A man who is skilled in his work can detect what is lacking in a plant, or lacking in the food supply for that plant. I think it would aid us a good deal if we would think of plants as requiring the same thing as animals;—that it requires food, warmth, and moisture in its home, which is the soil. The roots of the plant must breathe, and that means that the soil must be open and porous so that the air may get through; and in order that the roots may have a chance to spread out, the soil must be in such a condition that it will hold moisture, and it must contain the required amount of food. Our soils are not all of that condition. We have soils of various depths. Soils, of which the plant foods are not broken down to the condition where they are readily available for the plant, and that is one of the great objects of cultivation, simply that we may break down the inorganic substances, and bring these into the condition that the plant may make use of them, and that we may open up the soil so that there will be air in the soil for the plant to breathe. We can no more grow a good plant in the soil without opening it up than we could grow a good animal in a close, tight barn. We must give the plant the same conditions that we would the animal.

We know that the plants take up a number of different constituents from the soil, that they have the power of selecting the various substances from that soil, and that they have power to take into solution certain things that are in the soil. There are only some three or four constituents that are likely to be deficient in the ordinary soils. We have a number of soils, of course, that may require a larger number of constituents than that. In most of our soils it is potash, phosphoric acid, nitrogen, and lime that is particularly required, not for the soil's sake but for the plant's sake. Potash, nitrogen, or phosphoric acid are food substances, and just as essential to that plant's life as the different substances that we may take into our own bodies. The plant has got to have these or it cannot make the growth. More than that, while we may have some of all these different constituents present, the plant must have a balanced ration. There must be a proper arrangement of all these different substances in order to make proper growth, so that the plant requires a balanced ration just the same as an animal requires a balanced ration. We recognize the fact that if we are going to grow a young animal we will feed that animal differently if we want to produce a full grown animal or an animal that we want for the production of milk. There are plants that require feed in different ways according to the product we want to get from that plant. It is like a chain, which is just as strong as its weakest link. The question is, how are we going to get these different constituents There are a great variety of sources. Fifty years ago some of these substances were comparatively scarce. It is not fifty years ago since, in the neighborhood of Boston, they used to pay as much as fifty cents a bushel for Canadian ashes, and we were quite content to let them go from this country at five cents a bushel.

The supply of these food substances is not the only point that is to be taken into consideration. Before one can use artificial fertilizers, in any intelligent way, they must know something of the needs of the plant which they are trying to grow, what they wish to get from that plant, and what is required. Some plants will take one constituent from the ground readily, while another plant will have difficulty in utilizing that constituent. We, therefore, must know the power of the different crops to get their plant food from the soil. For instance, we do not want to apply a large amount of nitrogen which forces the leaf and stem growth of the plant. If we are

looking for a small amount of stem and leaf, and a large amount of fruit, then we must know something about the needs of the soil itself. Some soils contain a great many times more potash than other soils. Some soils may contain a good deal of it in available form, others may contain a small quantity of it, and that not in a form immediately available for plant food. Foods differ widely in the agents which are at work, and we must know and understand the fertilizers that we use before we can hope to use them intelligently. To a great many people a fertilizer is a fertilizer no matter what it contains. I know that there are a great many people who buy a fertilizer, and that is all they know about it. Just the same as some people buy potatoes and cannot distinguish one variety from another. We may have nitrogen in a fertilizer in a form that will break down quickly, and we may have nitrogen in a fertilizer that is got from woollen waste or litter, or hair, which will take a long time to come into available condition.

There are a great many things that the growers should know something about, and that are hard to get at. We must make the soil as congenial to the plant as we possibly can by methods of cultivation, and by selecting plants that are suitable to the soil.

Where we want strong leaf and stem growth, abundance of nitrogenous manure may be used without any fear of harm. A large amount of that may be used, because you are forcing a large growth. Where quality depends upon the crispness, and crispness depends on the rapidity of the growth, you can use abundance of manure, but always, of course, with a good supply of the other substances to carry on the growth. If we want a plant to ripen, or to bring fruit, such as the tomato, then we must keep back the nitrogen, because we want the fruit to come and the fruit is always associated with phosphoric acid and potash. There is always a difference in the way in which we would use fertilizers for these two different growths. Farmyard manure, of course, must always stand as a basis. Nobody would for a moment think of advocating that the farmyard manure be done away with, but farmyard manure is not a balanced food for all plants. It is essentially a nitrogenous manure and the use of large quantities of that will always mean that we will grow a large amount of leaf and stem. Large quantities of that manure would not be what we require for growth of crops that have to be ripened. Scientific research, the world over, has proven the fact that barnyard manure is used at a loss where there is a large application, because there is always a loss of the nitrogen, the most available substance in the manure. Experiments conducted in the Old Country have demonstrated the fact that smaller quantities of barnyard manure, backed up by the particular constituents required by the crop grown, applied in some soluble form, will give more economical results—will give healthier growth and all around better growth—than the use of too large quantities of barnyard manure.

Mr. ROBERTSON: As you know, I conducted some experiments with potash in growing potatoes, and I would like to ask how long does this phosphoric acid and potash last in the soil?

Prof. HARCOURT: There is practically no loss in the potash and phosphoric acid applied to the soil. You may add potash or phosphoric acid without fear of much loss. On the other hand nitrogen will be very quickly lost. Fertilizers should be applied long enough ahead to allow of their being fully diffused throughout the ground so that the plants may get it. All the experimental work we have done has been weak because we had not a chance to get the fertilizer on the soil long enough ahead. The poor re-

sults with the potatoes was due to the fact that there might not have been enough nitrogen there to give good growth.

Mr. ROBERTSON: There was good top growth.

Prof. HARCOURT: You got results the next year?

Mr. ROBERTSON: Yes; there was apparently little difference between the phosphoric acid and potash, and the phosphoric acid, potash and nitrogen. I would like to ask Mr. Rush if he could get much of these garbage ashes?

Mr. RUSH: Yes, there is about twenty tons of it thrown out. It requires a little wire pulling to get it.

Prof. HARCOURT: I value them at pretty nearly the same as ordinary wood ashes.

Mr. ROBERTSON: What do you value wood ashes at?

Prof. HARCOURT: About 1½ per cent. phosphoric acid, and from 1 to 5 or 6 per cent. of potash, and the lime from 30 to 40 per cent. This garbage ash Mr. Rush sent up would contain nearly 2 per cent. of phosphoric acid and about 2½ per cent. of potash, and a little over 8 per cent. of lime. With 1½ per cent. of phosphoric acid and 2½ per cent. of potash, they are worth about 5 cents a lb. and twenty hundred weight in the ton, that would be $1.50 for the phosphoric acid and $2.50 for the potash. It would be $4 a ton without saying anything about the value of the lime; and, where you are using such large quantities of farm-yard manure I think the use of that substance would be a good deal of value.

Mr. RUSH: I do not think that these ashes would contain the same quantity of phosphoric acid. Sometimes there is so much more bone collected.

Prof. HARCOURT: There is no doubt the garbage ash would vary.

Mr. ARMSTRONG: We tried that garbage ash fifteen years ago. The wood ash is altogether ahead of that.

Mr. JACKSON: Which is the best, hard wood ash or soft wood?

Prof. HARCOURT: I think, take it in every way, ashes are about alike. Hard wood makes a heavier ash. There would not be so much bulk a pound as for the lighter woods. A great deal depends upon the position of the wood in the tree. That from the limbs and branches will contain more potash than that from the trunk of the tree, and the limbs more than the twigs. As you pass upward you get more potash than you do from the root of the tree.

Mr. F. F. REEVES: Have you had any opportunity of testing the advantages of fertilizers as relating to green house crops, lettuce, and radishes?

Prof. HARCOURT: No, I have no experience of that whatever, but I can say, from the nature of the growth, what is generally required for a crop of that nature. You could give it a considerable quantity of nitrogenous manure to get the growth.

Q.—How would that best be put on, dissolved in water or mixed with the soil?

A.—I think it might be either way. I never would put on large quantities of it at once, give it a little at a time.

Mr. F. F. REEVES: I saw a patch last winter that had nitrate of soda applied to it. I think at the rate of a teaspoonful to two gallons of water, and that was applied about every ten days. It was not put on the leaf, but was worked into the soil, and a blind man could tell the difference on that patch of lettuce in the extra growth; and the part of the greenhouse,

where that was applied was cut ten days earlier than the other part. They had both good cultivation and the same soil.

Prof. HARCOURT: That is the point I want to make with reference to these crops. That is the nature of the crop that will stand nitrogen, and you will not get the best results by putting in a large amount to commence with.

Mr. F. F. REEVES: When this method was started the lettuce was about half grown, and the lettuce was better in every way, stronger and heavier lettuce. They were planted on a raised bench.

Mr. W. A. BROUGHTON, Sarnia: How would you apply the wood ashes?

Prof. HARCOURT: You can apply them whenever it suits your convenience. There is no danger of it bleaching from the soil to any great extent; therefore, I do not think it makes a great deal of difference.

Q.—Would harrowing do as well in every way?

A.—I would never think of plowing them down. They work themselves down into the soil quick enough, and all that is wanted is a harrow.

Q.—Would it do to put them into a drill with the potatoes?

A.—No, I would rather broadcast them. I think it is better to broadcast, them because the roots reach out into the soil.

Mr. MCMEANS: Gregory, of Massachusetts, advocates putting 250 bushels on an acre.

Prof. HARCOURT: When you put them on as heavy as that you may have to use a plow. A ton of ashes would contain 100 lbs. of potash, and that is a very fair application of potash for ordinary crops; that is a fair application to the acre. I do not believe in too heavy an application of ashes, more on account of the lime than anything else. Lime is practically a stimulant. It has some very beneficial actions on the soil and especially on soil that is heavily loaded with organic matter. The plant itself requires a certain amount of lime, and there are lots of soils that may have plenty, and you are only adding the lime and liberating potash in that soil, and allowing it to be backed away, so that too much application of lime would be injurious. That is one reason why I would rather see ashes applied in fairly measured quantities. I have seen the result of potash no more distinguished than on Mr. Heard's place at Burlington this spring. Where potash was not applied to the radishes they were hardly saleable, and where it was applied he had fine large radishes, and of good quality; and it was the same through almost every part of his ground. Mr. Heard can go to work and use potash on that field without any fear of losing money, because his ground requires it. No man can go to work and use fertilizers successfully until he has demonstrated, by some such means, what is needed for his particular soil and his crop.

Q.—Don't you think he would soon exhaust the supply of ashes.

Prof. HARCOURT: That is what happened fifty years ago when the Boston vegetable growers paid fifty cents a bushel. Since then the big mines in Germany are turning out thousands of tons of the mineral potash. No matter how careful things are husbanded there is a certain amount of fertility going away in the water, and so it is lost. It is now coming back to us in the mineral forms, which, by chemical means, are now brought into condition. We have in the atmosphere an immense supply of nitrogen which is being thrown open for the growth of plants.

Mr. RUSH: Is it not possible to apply too much potash for radish growing? I put radish seed in this garbage ash, and they have germinated, but there is too much potash for them.

Prof. HARCOURT: Plants have got different needs altogether just the same as animals or children require different treatment. To get the very best out of fertilizers you have got to understand your soil and the nature of the fertilizer you are using.

Mr. DELWORTH: With mineral potash is an article offered as kainit?

Prof. HARCOURT: Yes, that is in the crude form. I think the ashes would be better than the other. It may be that you cannot get enough of ashes.

Mr. DELWORTH: A very heavy application of stable manure may be conducive of loss, because we supply too much nitrogen in proportion ao the other elements that are required.

Prof. HARCOURT: I think so, and I am not surprised that our fertilizer experiments in this section were a failure this year. In only one case was there a decidedly good result from these fertilizers. At first, when I was given the names of those willing to co-operate in the work, I wrote to every one asking them something about the nature of the soil, and, when I got answers to the letters saying that they were plowing under 100 tons of manure every year, or they were plowing manure as thick as they could get it into the furrow, I thought I might save myself the trouble of sending in artificial fertilizers to that section. That soil must be loaded with plant food, and, in many cases, this applied upon low black soils that are rich in nitrogen.

The CHAIRMAN: Don't you think lime would be a good thing for our soils?

Prof. HARCOURT: I would rather experiment with lime alone for your soils.

Mr. ARMSTRONG: What about carbonate of lime; they claim there is a percentage of lime in that, and it could be bought for $1 a ton.

Prof HARCOURT: If you could buy carbonate of lime, ground, fine for $1 a ton, and if it is not very far to haul, there are sections through here where it would pay to put some of it on. The difference between carbonate of lime and the lime is that it has been burnt or heated until the carbon dioxid has been burnt away and left the quick lime in its place. On your soils that could be quickly broken down, and would be taken into solution the same as we have had in drinking water.

Mr. F. F. REEVES: Take that celery land; you went through that. What would you think would be a fair dose to give it of quick lime, ordinary brown air-slacked lime?

Prof. HARCOURT: I do not think I would advocate the use of more than about a ton and a half for the first application, and rather apply in three or four years' time. That is better than giving a heavy application.

Mr. F. F. REEVES: A few years ago there was a lot of gas lime hauled out our way.

Prof. HARCOURT: Gas lime at first applied would contain injurious salts, and it would rather destroy the growth than otherwise. After it has been exposed for some time, charges takes place, and the injurious substances are destroyed, and then it would have some value; but it would never have a value equal to the slacked lime.

Mr. RUSH: You saw those beds where I applied the gas lime; 28 years ago nothing would grow there. I even planted squash there, and they would not grow.

Mr. DELWORTH: Muck lands are deficient in lime.

Prof. HARCOURT: Yes; the longer the land is under cultivation, and the more organic matter is worked into that soil, the quicker they will become deficient in salt. I do not care how rich it may have been in the first place. As a result of the decomposition carbon dioxid is formed. That acts upon the lime and it is drained away out of the soil. That is the reason water is hard, and that is why our river waters run hard in a great many cases.

Q.—Is there a simple way of testing the soil to know whether it needs lime or not?

A.—Perhaps one of the simplest ways of testing is to get a piece of blue litmus paper and just put it into the damp soil, and allow it to stand there for some time and if that paper turns red, you may with great assurance apply lime to that soil.

Q.—How long would you leave it there?

A.—A half hour.

Mr. ARMSTRONG: Have we got in Canada that carbonate of lime in mineral form?

A.—Lots of it. All the lime stone that is used in building foundations and brick work is carbonate lime.

Mr. ARMSTRONG: It is carbonate of lime they are selling in Lousiana. They claim it contains 99% of lime; is that equal to the same lime we get in wood ashes?

A.—The wood ashes is just as good as the other, and the carbonate of lime that you will get out of your own lime stone rock will be as good as the lime stone rock from Louisiana. Down through Louisiana they have a great deal of this calcium phosphate, which is being commonly made into superphosphate and a great many are advocating the use of that; but I would not advise any of you men to buy one pound of superphosphate. I would not pay the extra price. It would be better to buy ground phosphate and alow the excess of carbon dioxid that you are bound to have in your soil to do the solution for you.

I would like to make another point in connection with last year's fertilizer experiments. After visiting the plots, I was afraid that possibly the superphosphate was doing too much to the soil, and that might have checked the crop as much as anything else. I would try phosphate or basic phosphate substance rather than superphosphate on the nature of soil that you have here near Toronto.

Q.—Which would you consider the cheapest source of phosphoric acid, ground bone or this mineral?

A.—I think possibly the ground mineral fertilizer would be the cheapest source of phosphoric acid. Of course that powdered up bone is very rich in phosphoric acid. It will contain as high as 30 per cent., whereas the superphosphate would contain about half that amount. Straight ground bone would contain twice as much phosphoric acid as superphosphate, and for land around Toronto would be twice as valuable as superphosphate. I think, on the ordinary crops, you could afford to pay pretty nearly twice as much for the ground bone as you would for superphosphate.

A MEMBER: I buy Armour's pure ground bone for $30 a ton.

Mr. RUSH: Would you advise the ordinary gardener around Toronto not to buy these artificial manures. There are men in this room who pay $60 a year for this Bradley Fertilizer, and I think if they are wise they will save that money next year, and buy a few tons of lime and have better results.

Prof. HARCOURT: I rather think they would if it is on such soil as I visited. Bradley fertilizers are good fertilizers, and in most of them the

nitrogen is in an available form, but whether there is a mixture there, of these substances in the proportion you want is another thing.

Q.—You do not believe in buying mixed fertilizers?

A.—I certainly would not for such ground as I visited in this section. I would say, try a little lime this year and see what you can get from it, and let that guide you as to future work.

Mr. McCalla: Spinach is a crop that requires plenty of lime. I grew an acre of spinach last year, and I gave it a dressing of air slacked lime and put on Bradley's mixed fertilizer, and I got off the piece that had Bradley's fertilizer and manure, ten tons to the acre, and the piece that had lime was not worth cutting at all, and on the heavier parts of that land it was about half a crop. So that the last advice which Professor Harcourt gave us will have to be taken cautiously, and we should not jump from the fertilizer to the lime.

Mr. F. F. Reeves: Your land is far different to ours?

A Member: The land around this district is composed principally of sand.

Prof. Harcourt: The part I visited was hills between re-claimed swamps.

A Member: We have heavy clay, and as far as stable manure is concerned we get it for the hauling, and our land is pretty well full of manure.

Prof. Harcourt: You cannot do as well in clay land unless it was opened up with farm yard manure, and I do not care whether it is clay land or what it is, no soil will give good results unless there is an amount of decaying organic matter present to give it that openness of texture. Lime will have good results on clay soil. It has a stimulant action, and it will liberate potash from the clay substances. Clay is usually rich in potash. Lime will improve the condition of the clay soil. I would advise you to try some lime, about one ton and a half to the acre.

Mr. Rush: Would clover plowed under be equal to barn yard manure?

Prof. Harcourt: Whenever you can get clover to grow, and you can spare the time to attend to it, I would certainly grow clover, because that is one of the plants which will bring back nitrogen out of the atmosphere, and through its long roots it will bring up substances from the sub-soil.

Q.—When is the best time to plow down the clover? I had a piece this spring, and it has made good growth.

A.—I do not know as it would make any difference whether you plowed that this fall or next spring. It has got everything it is going to have. It depends on how soon you get the crop on it next spring. I would not like to say that lime would give results on any soil; for instance you have the example Mr. McCalla has given. There was soil that was benefited by direct application of plant food.

Mr. Armstrong: Where you want to use potash and lime what would you suggest as being the cheapest commercial article for that purpose?

Prof. Harcourt: If you can get ashes you may be able to get potash cheaper in the ashes than you would in any other way. I think you would have to take into consideration the greater bulk of substance you would be handling and the distance you would have to haul it. Muriate of potash will contain about half a pound of pure potash, and 100 pounds of the ashes will not contain more than about five pounds of potash, so that one contains about ten times as much potash as the other, and one is in about as good form for ordinary crops as the other. There are some crops that will be injured by muriate of potash. For instance you should use muriate of potash

on tobacco, and where crops are being grown for wine they do not care to have muriate of potash.

Q.—Why is that?

A.—Because of its effect on the ash; the tobacco does not burn free; and in the grapes it has an action on the sugars. In sugar beets it prevents crystallization and the extraction of the sugar. For ordinary vegetables it would not make any difference.

Mr. RUSH: I draw the refuse from the wine press at the Lees Wine place.

Prof. HARCOURT: The most valuable constituent there would be potash.

Q.—Does it give you any result?

Mr. RUSH: I do not know; we pitch it on pretty heavy, we put it in the pig yard.

A.—That would tend to make your soil acidy.

Mr. MCMEANS: Would there be any difference on potatoes between muriate of potash and ordinary potash?

A.—Yes, the sulphate makes nicer flavored potatoes than the muriate.

Mr. ROBERTSON: What success have the chemists had in taking the nitrogen from the air by chemical processes.

Prof. HARCOURT: There is a substance calcium cyanamide, which is being experimented with somewhat in England and Germany with very good results. It is stated that it is equal to nitrate of soda as a fertilizer. It is got by taking and heating calcium carbide in the atmosphere at a high temperature.

Mr. DELWORTH: Have any experiments been conducted with nitro-culture?

Prof. HARCOURT: A great deal of it is being sent out for different forms of clovers, but I think as a rule you will find that in Ontario our soils are fairly well inoculated with the germs necessary for that work. There are some places where the soil is not inoculated for lucerne.

Prof. HARCOURT: We have a Fertilizer Act in this country that protects the gardener in the purchase of fertilizers. The law says that any fertilizer sold at more than $10 a ton must be sold per guarantee, and you can demand the composition of any fertilizer that you are buying and paying more than $10 a ton for. In looking over the last report of the Inland Revenue Department, I noticed there were 42 different fertilizers sold in this Province, and 17 of these were unregistered, which means that there were 17 samples sold contrary to law.

Mr. DELWORTH: I have understood that according to our law they have to guarantee the analysis, and there the matter rests; if it does not come up to the guarantee what are you going to do about it. A law suit is our only redress, and therefore, the law is not much use to us.

Prof. HARCOURT: Every man who is selling a fertilizer at more than $10 a ton has to send a sample to Ottawa, and they analyze it, and they may use that analysis as a guarantee. The Government sends men around to collect samples of that brand, and they analyze those samples to see if they come up to the standard.

A MEMBER: Suppose I bought a car load of ashes and they were shipped in an open car, and if it rained when they were in the car would I lose anything?

A.—Not unless there was sufficient to make drainage through the car. If there was no water leaking away you would not lose anything, and if there was water leaking away you would.

FORCING OF EARLY VEGETABLES.

By E. E. Adams, Leamington.

The forcing of early vegetables, has become a business of considerable magnitude. Not only in our country, but in the United States, large glass houses are being built for this purpose alone, and a person may well ask the question "Does it pay? and if so, can I hope to succeed at the business?" Many have gone into this business with little or no knowledge of the care and attention which it demands. Many failures have occurred, and will occur as long as man's incapacity lasts. Speaking of my own experience, I may say that I have not grown a general list of vegetables either under glass or in field. My own work or business has been the growing for early market the following fruits or vegetables:—Tomatoes, peppers, cabbage, beans, muskmelons, and sweet corn. These are all grown in the field, not forced under glass. Tomatoes, peppers, melons, cucumbers, and cabbage plants are, of course, started under glass, not in hot-beds, but in glass houses, heated by steam.

Tomato and cucumber seeds are sown in moderately rich soil in flats the latter part of February. Tomato plants are pricked out into other soil in about two or three weeks, being given at this time a soil space of about 4x6 inches, and then again moved the latter part of April or first week in May into veneer sections 5x5x5 inches with no bottoms, or, they can be moved into flats, for convenience in handling. The flats which I am using are 12x22 inches inside, and 5 inches deep. These flats are placed upon the benches, and the plants grown to the desired size, and then moved out in beds either dug in the ground, or built above ground with lumber and covered with cotton. I put eight plants to each tray. This cotton cover is for the purpose of keeping cold winds off the plants, and also to assist in hardening the plants, before being set out in the field.

I prefer to water thoroughly, being careful to see that all portions of the bench soil or flats are evenly done. Water is run on with a half-inch hose with no nozzle, not with heavy pressure, but gently. When planting out time comes, usually about the 18th or 20th of May, it is found very convenient to handle the flats into our waggon, sending them to the field quickly. In preparing the soil for growing these plants in the houses, I usually pile up sods, taking them from either sandy or clay loam fields, and pile up with alternate layers of fresh horse-manure, letting this stand over winter and cutting up fine as early in the spring as possible. This gives a soil containing a large amount of fibre; it does not dry out quickly, and in decomposing feeds the plants for a considerable time. The soil for field culture, should be fairly rich in humus, clover or well decayed manure being turned under in the fall. Either of these will be well incorporated in the soil by the following May.

Before setting in the field after plowing my soil, which is a light sand, and after using the disk and smoothing harrows, it is well to mark out nice and straight rows, and plow furrows about five inches deep, in which the plants may be placed after being cut from the flats carefully, giving them three and one-half feet in the row, and rows five feet apart. These furrows may be filled in at once by a man or boy following up with a hoe and drawing the soil around the plants. Or, some may prefer to mark out their land both ways according to their own notion, and dig the holes with a spade. That is a matter of personal taste. As soon as planting is all done,

nitrate of soda is applied around each plant, care being exercised, that none of the soda is put on the plant, for where it is so left it will burn them. This should be avoided on general principles, for the nicer and more carefully we can do our work, the more profit and pleasure we will get out of it. I always use one ounce of soda, sprinkled around each plant, and when it is all on, the tooth cultivator is put on, and the ground cultivated both ways, to mix the soda in thoroughly. Cultivation is practised twice each week, first one way, then the other. Not much hoeing is required if cultivating is done carefully. I generally hoe but once, although no set rule will apply on that part of the question. I have applied, as a test, two applications of soda, to find out if it will increase the crop, and I find that there is little if any advantage in that.

As to fertilizers:—I am of the opinion that with South American Guano, which contains 3 per cent. nitrogen, 2½ to 3 per cent. potash, and about 18 per cent. phosphoric acid, built up with sulphate of potash, so that we will have perhaps from 6 to 8 per cent. of that ingredient, we would then have a very good, efficient, and safe fertilizer to use. I used this on a portion of my crop this year, with no barn-yard manure, and had very nice smooth fruit, and a liberal supply. But, on another portion of the crop, I used well decayed barn-manure with an ounce of soda to the plant, and picked during the fruiting season continuously from this lot, and at the last picking about the 20th of August, I picked an eleven quart basket of as fine fruit as I had at any time during the season. Further tests will have to be made, to determine just what fertilizers are the best and most profitable to use on tomatoes.

The next thing you do after you get a good crop of tomatoes, is to sell them for a big price, if possible. Cabbage is started under glass, and moved on flats, giving it about 3x3 inches space, and watered once a week with manure water to which has been added about two to three pounds of guano and one pound of soda. If they need further watering during the week, give them clear water alone. Cabbage is a gross feeder, and plenty of nitrogen should be given to make good strong plants, and I am fully of the impression that from a week to ten days can be gained in earliness of the crop, if the plants are strong to begin with in the field. The soil should be very rich, and well cultivated and conditioned before planting, and immediately after planting, soda should be applied around each plant to the amount of at least ½ an ounce, and hoed or cultivated in with a fine-toothed cultivator. In the course of a week, I generally sprinkle soda in the rows again around the plants, but a little further away from the stem—about the same quantity of soda. Again, about the 1st of June, another sprinkling of about 200 pounds to the acre is made in the centre of the rows and cultivated in at once, or the cultivating may be omitted if a shower is on when applying. This will dissolve the soda, and carry it to the roots quickly. I have some experiments with commercial fertilizers, this season, and am not satisfied that they are a profitable article to use. One plot, 1-20th of an acre, was planted with no fertilizer, another plot, same size, was fertilized with 400 pounds of acid phosphate, and 200 pounds soda, the soda being given in two applications; and another plot was given 160 pounds muriate of potash, 400 pounds acid phosphate and 200 pounds soda, per acre. The plot given no fertilizer, was very poor; the plot given soda and phosphate was about 40 per cent. better, and that given soda potash and phosphate was 50 per cent. better than where none was used, but that portion of the crop upon which I used barnyard manure (a very light coating being given), but with the addition of about 500 pounds of soda to the acre, was about 30 per cent.

better still. Apparently, this would show that manure and soda are very satisfactory and profitable.

In 1905 my early cabbage was the finest that I ever grew, the variety being Early Jersey Wakefield. No manure was used that year, but a light coating was used the previous season for a melon crop, and before planting the cabbage, a sowing of guano was made and the soil harrowed several times to thoroughly mix or pulverize it. The plants were put in rows three feet apart and two feet in the row. Nitrate of soda was sown in the rows and cultivated, and in ten days another sowing was made during a light shower. These last mentioned sowings would amount to about 150 pounds an acre at each sowing. This cabbage crop was very fine, and sold for good money.

Cucumbers and muskmelons are started under glass, the seed being sown in flats, and when in the third leaf are moved into other flats or pots as desired. The soil for these pots is composed of good garden soil with the addition of about one third its bulk of well rotted horse manure droppings well mixed. Careful watering is required in order to keep up a steady and uniform growth. At planting time the pots are full of roots, and ready to grow without interruption, weather conditions being favorable. I plant to the field about June the 10th. The soil should have had a good coating of well rotted manure, or a clover crop turned under, and well harrowed down. Growth can be forced by the application of one ounce of soda well worked into the soil around, but not close to the plant.

I have grown some tomatoes under glass, having grown Earlibell, Earliana, Magnus, Burpee's Combination, and Dwarf Champion. These were about 12 inches high at planting time (May 10th), and began fruiting July 1st. The Earlibell and Earliana were the best varieties for that season (1905). I have not grown any during the winter months. Lettuce is grown for a fall crop, and is all off before Christmas, and is sold by the pound, 15 cents being the price I get for it. It is, or has been grown on ground beds, but I have some now on benches which is growing well so far this fall. I can see no difference yet. I generally sell, when the plants run from six to eight ounces in weight, which make very fair looking lettuce.

I have grown cucumbers under glass, and have found the Perfection Hot-House to be about the best I have grown, on account of fine size, color, and flavor. For fertilizers in the greenhouse, I use well rotted manure worked into the soil, and as far as I can see at present, I prefer guano as a top dressing, and also a good addition to the manure water barrel at fruiting time. Two pounds of guano are added to 40 gallons of water, and about a bushel of fresh stable manure is put in a bag into the barrel. This makes a very rich manure water, and gives a good color and vigor to the plants. It is advisable to thin out the growth somewhat, as generally there is too much vine, and I think plenty of light is advisable, and by thinning out the sun can get in and not permit of the house being too damp. I am of the impression that they do not fertilize well, unless the atmosphere is somewhat dry, to permit of the pollen in the blossoms becoming in proper condition for doing it's best work. The only disease, if it can be called so, is a splitting of the vine at the surface of the ground. I have examined several plants so affected, and have found a little fine worm white in color, and about 3-8 inch long. This is, or may be the larva of the cucumber beetle, but I am not certain.

Some growers claim that plants should be planted well above the surface of the soil to permit of good drainage, and that this will prevent the vines from splitting, they claiming that too much water causes the corrod-

ing or splitting. This may be so, but, that will not do away with the little worm in question. Tobacco dust is said to be a good material to put around the plants to prevent the beetle from working, but I think that the regular Bordeaux mixture will do much better, this being used largely for field work. Constant care and attention is required in growing cucumbers as well as melons in the field, in order to prevent blight. They must be sprayed almost at once when put in the field, and for best results, should receive applications about every ten days; or in other words, keep the plants if possible, constantly covered with the spraying material, and there is a fair measure of success in sight.

I have tried radishes under glass in the spring months, having used the Long Scarlet, Early Scarlet, Turnip, and Burpee's Hailstone. The Long variety was a complete failure. The Hailstone was the best. It is white, and very crisp and solid. Never having grown or tried to grow them before, I did not meet with success, and am open for advice. As an amateur, along with others in our country, I am endeavoring to find out from others, as well as to work out for myself some of the problems that we run against. As to the question of profit, I have as yet been unable to get at some facts that are essential for a person to know before treading too far into the work, for the question of cost must be considered by every grower. If the cost is too great, then we must call a halt. The work has it's compensations, however, even if no large returns are made from it. It is a great satisfaction to see plants grow right, as well as to reap the crop. Pleasure and profit are a good combination.

Mr. Hilborn: Are you troubled with blight on the tomato?

A.—Yes, we are, but I do not do anything to prevent it.

Mr. Robertson: Have you sun-scald on tomatoes?

A.—Yes.

Q.—What do you do to prevent it?

A.—Nothing. The largest amount of sun-scald we get in the field where it is close by a hedge or where there is not sufficient circulation of air. Out in the field, where there is a free circulation of air, I do not know that I have found a tomato that was scalded.

Q.—Will you spray some of your early plants with Bordeaux mixture, and leave the others, and I will do the same and report on it next year?

A.—Yes.

Mr. Robertson: I believe that the cause is mildew, and I believe the Bordeaux mixture will control it. I have one end of my field near a bush and that is where I get the mildew.

Mr. Chairman: Do you think that the Bordeaux mixture will check the mildew?

Mr. Robertson: I am positive that the Bordeaux mixture is beneficial in all fungous diseases. I do not say that we can kill it, but we can prevent it.

A Member: Sulphur and lime is better for onions than the Bordeaux mixture.

Mr. Delworth: What kind of soil do you grow your tomatoes in?

A.—A light sand.

Q.—What kind of sub-soil?

A.—Just sand down as far as you can go. My well is 45 feet to the water, and we get our water in a quick sand.

Q.—What rule do you adopt in thinning out your cucumbers?

A.—We cut off all the shoots two feet above the ground; we train them up on binder twine made in the form of a Page wire fence.

ONION GROWING.

By E. G. Malcolm, Scotland.

When I received an invitation to speak upon onion culture at this meeting, I hesitated for some time to accept, for I felt my inability to do justice to it. Although I have grown onions for some years I am practically a novice at the work. It appears to me that onion culture is only in its infancy. This Dominion is not producing nearly the amount that it should, or that it will raise in the near future. We have the proper climate and the soil to produce the best onions in the world. Having the proper foundations to start with, why, then should we not be at the front and produce enough for our home use and have some for export. At present there is a great number of car lots of onions brought in from the States.

To grow onions successfully it is necessary to have a good loam or sandy loam with loam predominating. It should be made as rich as we know how to make it, and to reach that end I know of nothing better than a successive application of well rotted stable manure from forty to fifty tons an acre.

In some places that is difficult to get and, therefore, each grower must do a certain amount of experimental work for himself before he can find out what will be the most economical fertilizer for him to use, because soils differ not only in chemical composition but also physically. I do not use any of the onion fertilizers, because I think that there is more cost than profit. A number in our section have tried them at different times and they have come to the same conclusion. I do not think that you can supply enough plant food from fertilizers; onions need more vegetable matter. We use a great amount of wood ashes and salt—from four to six hundred pounds to the acre. This is usually applied after plowing, and sometimes just before sowing.

Plow as early as possible in the spring. By doing so moisture is preserved. Prepare your seed-bed by rolling with a heavy roller. (That must be governed by the soil; if there is clay I would not use a roller.) Then, put on your planker or roller. I prefer a plank as it gives a nice, mellow smooth seed-bed.

Last year a few plowed early in the fall and worked the ground well, and in the spring top-dressed with manure, but, of course it was well-rotted and fine, so that it would not interfere with the cultivation. Out of four experiments three appeared to produce a better crop than by plowing in the spring. The one had the appearance of being an exceptional good crop early in the season. But, from some cause, they did not bottom up well; they were small in size, with a great amount of pricklers. The previous year this piece of ground produced the best onions in the vicinity. I am unable to account for so great a change.

The variety or kind of onion to grow has to be determined by yourself, as some markets seek one kind and some another. In our section we grow the yellow variety most; some of Southport, but the greatest amount is "Globe Danvers." There is a growing demand for Red Globes but only a few cars of them have been asked for. I have references to our market at home. I would recommend the Yellow Globe Danvers and Red Globes.

After choosing the variety comes the buying of seed. In that a person should be careful, for upon the seed depends the crop, to a great extent.

The very best seed that can be procured is the cheapest in the long run if you do have to pay a higher price. Poor seed is dear at any price. You want seed that is sure to germinate.

Do not be in too great a hurry to get the seed in the ground. Have the ground thoroughly warmed before sowing, or the weeds will get started before the onions, when the expense of keeping clean is too great.

We use the hand-drills and sow in rows from twelve to sixteen inches apart; I prefer fourteen inches as that gives sufficient space in which to work. When the onions make their appearance through the ground, start harrowing. By that means you will loosen the ground and kill weeds. The more you work the harrow the less weeding you will have to do by hand. The harrow that is used is made from light material, pine or elm strips, three quarters of an inch by two inches and three by three by four feet, with common spike nails for teeth. Then attach a strap or rope to pull it with. One man will go over a couple of acres in a half or three quarters of a day. In some cases they use a horse and have the harrow twelve to fifteen feet long and three feet wide. At first, you would think that this way would be very injurious to the crop. A few onions are destroyed by the horse, but the amount of time saved exceeds the loss by a long ways, for when the crop is ready to harvest you would not know that a horse had been on the ground.

As soon as the onions are up high enough to follow the rows, put the cultivator to work with wings on, and work as close to the row as possible, not covering the young plants with earth. We usually start hand weeding immediately after cultivating the second time, cultivating astride the row. We continue using the cultivator or digger as long as possible, for by so doing we retain moisture and keep the weeds under control. If kept perfectly clean the harvesting is much easier.

When the onions are ripe, or when the tops have fallen, the harvesting begins. We usually pull six rows and throw them into one. That gives a nice windrow to top and places the rows convenient for sacking. The sacking has to be governed by the number of men employed. We usually have five in a gang, four picking and sorting and one to hold sacks. They place them in piles, from six to ten sacks in each pile. After sacking, they are weighed up at seventy-six pounds, or eighty-one pounds a sack, but usually seventy-six pounds. Then they are ready to be loaded on cars. Very seldom, with us, are any onions housed, as the demand is so great the buyers are anxious to have them shipped as quickly as possible.

This year, owing to the shortage of cars and wet weather, a portion has been housed. The difficulty in getting cars has been a great hindrance to our section. The average crop is about 300 sacks an acre, but in some cases they will go 400. That would be about 450 to 600 bushels an acre. My talk with you is in regard to onions grown from seed. We do not grow onions from Dutch Sets or transplanted ones.

I have just given you an outline of the way we grow onions, and it would appear as if it were a very easy thing to produce a good crop, but there are many drawbacks in connection with the work. First, is the maggot, which is very small and white in color. Very often we find as many as thirty in one small onion, say the size of a pipe-stem. They follow the row and destroy from six inches to a foot in a night, for they work principally at night. They continue their work for about ten days or two weeks, and we have been unable to find anything to destroy them. We hinder their work by sowing a few turnip or radish seeds along with the onion seeds; they prefer the turnip.

The gray or corn grub does a lot of damage at times, but we overcome them by soaking bran in a solution of Paris green and sow it broadcast over the ground.

Then the blight appears in spots throughout the field and is very injurious. It usually makes its appearance in dry weather and has the appearance of mildew. The onion top begins to die, leaving a small pointed stem on the onion. The neck of the onion will be spongy and full of juice, which causes the onion to soon decay. Onions hit with the blight are not fit for shipping purposes. For the maggot and blight we have no known remedy, and would like to have the Professors at the College help us out and give a remedy to get rid of them, if possible.

I have heard it stated that they have not a suitable place at Guelph to experiment on vegetable growing. I might suggest that they try an experimental station in our vicinity, for we can grow all kinds of vegetables as well as fruit. Grapes and peaches are being grown there extensively.

The CHAIRMAN: In applying the salt, have you the maggot in view?

A.—Yes, I think it clears away the maggot to some extent.

Mr. RUSH: How long after the onions are sown do you use the harrow?

A.—There is no set time; sometimes they do no come up as quickly as at other times. We use a horse on the harrow, and then we have a much larger harrow 15 feet in width. Of course, it will destroy some of the onions, but you will not notice the loss when you come to harvest the crop.

Q.—Do you ever use the Breed weeder?

A.—No.

Q.—This is done before the seed leaves the onion top?

A.—Yes, just as they are coming through.

Q.—How long do you consider it profitable to grow on the same ground?

A.—As long as you can keep it free from weeds.

The CHAIRMAN: You do not put any green manure on your onions?

A.—Sometimes we have not as much well rotted manure as we would like to have. We do not put any green manure on as a top dressing, we plow it under.

Mr. BUSHEL: Would you recommend sowing wood ashes along the top of the ground after the onions are transplanted?

A.—I would prefer sowing it before the onions are transplanted.

Q.—My idea was just to sow along where I had the line?

A.—We do not transplant any onions; ours are grown from seed.

Q.—Do you ever sow any onions in the fall of the year?

A.—No, that would be all right for transplanting.

Q.—Do you ever sow any onions without plowing the land? Take land that is loose, and just disk it up. I have heard it contended that an onion required a hard bottom?

A.—I agree with that provided it is rich. If we plow in the spring we use a heavy roller to make it solid.

Q.—How deep do you plow?

A.—We have no uniform depth; just plow it so that it covers up the manure about five or six inches.

Q.—What class of people do you get for hand weeding?

A.—Just ourselves, that is one of the great drawbacks we have up there, scarcity of help. We have been endeavoring to get some Indians off the reserve.

Mr. ROBERTSON: About the onion blight: You should get the bulletin issued by the Cornell University, Ithica, N.Y.? I am not particular

about the rotation of onions. So long as we can keep the weeds down we do not change.

Mr. ARMSTRONG: I have heard it said that you cannot grow tomatoes successfully for more than four or five years on the same ground. I have grown them on the same ground for sixteen years, and last year was the best crop I ever had.

Mr. TRICK: A man in our neighborhood has grown tomatoes on the same ground for 25 years. He uses blood and bone fertilizer, and he gets better crops all the time.

Mr. HILBORN: How do you put this bran with the Paris green on the ground?

A.—I mix a solution and dampen the bran one or two days before sowing it so that it gets thoroughly poisoned through, and I sow it broad-cast in the afternoon or towards evening, and the next morning you will find any amount of grubs on the top of the ground.

Q.—What about the birds that eat the grubs?

A.—I suppose they have their own time of it.

Q.—How thick would the application of bran be?

A.—Just the same as you sow grain broad-cast.

Mr. RUSH: Did you ever try pinching them?

A.—That is rather slow.

Q.—Do you consider that the blight and mildew are related?

A.—I think they are the same.

Prof. H. L. HUTT: They had a blight on the small onion at the Agricultural College. They were well taken care of. I asked the gardener as to how long onions had been growing on the same ground, and he said, as long as he could remember, and he had been there 20 years. The onions were so small that they would not weigh much more than an ounce. As soon as I took charge I had a rotation of crops and ever since that we have had onions of a very large size. It is a very common impression that onions may be grown year after year on the same ground continuously, but I do not think that there is any doubt that you will exhaust the ground in time of the elements upon which that crop feeds. If you adopt that plan of continuous cropping you must certainly get the ground more infested with the onion maggot, and I think that the matter of the rotation of cropping should be looked into very carefully.

Mr. ARMSTRONG: Where a man is an expert and able to supply what is extracted from the land he can use the same ground. We use it simply because it is the very best for the purpose.

Mr. MCMEANS: Do you do any work towards cleaning your ground after the crop is harvested?

A.—Yes, owing to the scarcity of help we summer fallow part of the land and we plow under the onion tops.

Mr. MCMEANS: One of the boys from our locality went to Kalamazoo, and when he came back he said that he had seen the biggest crop of onions he had ever beheld, and the men who grow these onions clean up every bit of their land in the fall. He asked them why they did that and they said that they wanted to grow onions on that land next year, and wished to have it thoroughly cleaned.

Mr. GAMEY: I have a strip this year that has got the black mildew just like the smut on grain.

Prof. HUTT: I think that it is a different stage of the same disease. What do you attribute the scallion onions to?

A MEMBER: I think that it is the seed. I had two patches of onions on the same ground and one had scallion and the other did not. I think it was due to the seed, because I had two different kinds of seed sown on that ground.

The CHAIRMAN: I think that you will get thick necks as long as you sow onions on black muck. We sow about two and one-half pounds to the acre and we do not have to thin out very much.

Prof. HUTT: I think that if the seed is grown from immature bulbs you are likely to get a large amount of thick necks. The onion is grown on black muck around Kalamazoo, and they grow beautiful white onions right between the celery, and they are very careful to cover all refuse, so as not to allow the fungus or insect pests to infest the soil.

Mr. COLLINS: I grow my onions on black muck, and I very seldom get any scallions, unless it is caused by the seed. The land may have something to do with it, but I do not think that it is the black muck land.

Mr. MCMEANS: Five miles from our place they have black muck land, but it is very different from the black muck we have. Their muck only seems to be down three or four inches, and there is light sand underneath it and quicksand underneath that. They produce good onions on that muck. The muck I had reference to would run from six inches to four inches deep, and it is a clay and lime sub-soil.

Q.—How much wood ashes an acre do you usually apply?

A.—That I really cannot say, because we never weigh them. We get all the ashes we can, and mix them with salt, and sow them perhaps a week after they are mixed and sow them broadcast the same as grain. Take a medium hand full and give it a cast at a step.

Q.—About what proportion of salt?

A.—About one-third, sometimes a little better.

CELERY GROWING.

BY T. BENSTEAD, STRATHROY.

You can grow celery on almost any soil, but to make money out of it, you must have black muck. I manure my ground during the winter when the ground is frozen. I put on about fifteen loads of manure to the acre. As soon as spring opens up, and the ground is fit to plow, I plow it about five inches deep. After that I work the ground thoroughly. The next thing I do is to put about sixty bushels of wood ashes to the acre. I then work the ground again, first with the disk and then with a harrow, and again I put on ten hundred pounds of bone meal; then another stroke with a disk and smoothing harrow. Next half a ton of salt. (The reason I put them on separately is I can better see what I am doing.) I then have got the ground pretty well manured to start with. I somtimes use a little fertilizer between the rows, when the crop is growing as I believe that that is a better plan of fighting blight than spraying. I find that if the plant is well fed the blight does not bother it much. I then keep the ground thoroughly cultivated until we are ready to put the plants out growing.

The plants for early planting we start in a hot bed about the fifteen or twentieth of March. If we start much sooner we find that we have quite a lot of bolters or seeders. We sow in rows about four inches apart in the hot-bed and about as thin as we know how. As soon as these plants are two

inches high we transplant them about two inches apart each way in a nice sheltered bed of well enriched soil. For the main crop we sow the seed about the middle of April in the open in beds about five feet wide with about an eighteen inch walk between the beds. I like to shear the tops of these plants about this time, and I like them to stand not too thick and close together. I find that these plants—by so grading as not to mix big and small plants together,—do not sucker nearly as much as transplanted ones. They can be planted much faster, and you can grow just as good a crop.

In planting I pull most of the plants myself, and put them in boxes about four inches deep with wet soil or moss in the bottom, the plants standing upright. These boxes are small and handy for the boy to carry, and drop them out at each space. They then do not get wilted before they are in the soil, and a man will plant far faster when the plants are kept nice and fresh. A good planter will plant from eight to ten thousand a day.

I run rows north and south as the sun shines on both sides of them, and I know I get a better crop than where the rows run east and west, with the sun shining most of the time on the south side of the row. To mark or space the rows I use a wheel with cleats nailed on for single rows, six inches from plant to plant; for double rows, seven inches. I do not know that this is altogether a necessity, yet I know that it pays, as a man will plant faster and your plants are a uniform distance apart, and again in double rows, the plants being exactly opposite each other. You can hoe them just about as handily and as fast as a single row. In laying the ground out, on the space between rows, we always have used a line, and for celery that I intend to bleach with lumber, we put our rows three and a half feet apart; for what we intend to bank, four feet, in planting. Our land is nearly always damp enough so that we can plant all day. About a week after the plants are out we start cultivating, going as close to the plant as we can without smothering them. I start a six to eight tooth cultivator and let it run deep for two or three times, and then ease up a little, but I do not stop cultivating. If the weather is wet it warms and sweetens the soil. If the weather is on the dry side, shallow working of the soil, I find, keeps it moist. In a real dry time we rub the soil, and a very good thing for that purpose is an old harrow with the teeth removed and two pieces of scantling wired to the frame so that they work the soil from the plant instead of throwing it to. A hot soil coming in contact with the plants does not do them any good. Rub the soil every day if possible, in a very dry time, as the crop is evaporating much, and our only hope is to head off capillary robbing. I have a boy sixteen years old who can plant 1,000 plants an hour from morning until night.

Q.—Do you notice any wilt after they are planted?

A.—No, our land is always moist. Our planting generally runs over 20 or 25 days. After the plants are in I start to cultivate with a fine tooth cultivator, and work pretty close to the rows. After they have made some growth I put on a big tooth cultivator. We have to use bog shoes. The horses cannot walk on it without an eight inch bog shoe on. I like to cultivate once or twice every week. I always plant double rows, and have the plants exactly opposite one another. I can hoe a double row, just as fast as you can hoe a single one. I plant them seven inches apart each way. My rows are three feet nine inches apart where I bleach with boards; and where I bleach with muck it is four feet apart. I have never been bothered with blight. I grow the White Plume, The Golden Yellow, and The Golden Heart. I believe that the blight is caused quite a bit by the manure used. I believe you could feed past the blight. A gentleman half

a mile from me has the same kind of soil, and this year his crop was completely killed by blight. I raised the same celery, but he uses nothing but barnyard manure.

Q.—Was your land a cedar swamp?

A.—Tamarack swamp. It is full of decomposed wood.

Q.—Will your land dry out?

A.—No, I have a tile drain every four rods, and my tile are down about 20 inches. When I put the tile in I put a good coat of straw on them.

The CHAIRMAN: I scuffle just as little as possible after the celery gets six inches high.

Mr. BENSTEAD: I scuffle as much as possible; if you scuffle deep on the start your roots will grow deep.

Mr. RUSH: Did that neighbor of yours, whose celery was eaten up by blight, plant salt and wood ashes?

A.—Nothing but barnyard manure.

Q.—Do you think that the ashes and salt is a preventive?

A.—That is what I said. Salt is a preventive of slugs. For bleaching early stuff I use foot lumber 16 feet long. I wire through from one side to the other. If you put it up straight it will never warp. I generally calculate about four dozen and a half celery to each sixteen feet, and I, therefore, know just how many boards to take up when I want to ship. For bleaching with muck I start in about the 20th of September. I go through with the Planet Junior and throw up some muck, and we use a bush scraper with a man on each side of the row for the last operation. This year we had a snow storm of fourteen inches on the 10th of October, and it covered my crop of celery completely, and my White Plume was badly broken down.

Q.—Do you grow single or double rows when you bleach with earth?

A.—Double rows. The only celery I grow in single rows are the Golden Heart winter celery. It takes three weeks to bleach with muck. Our muck washes off pretty easily if you do not let it dry on. You must take it to the wash room directly after you take it up. I do not use a brush; never use anything for washing. I use a force pump. I am putting in water from the waterworks, and then I will get all the pressure I want.

Mr. RUSH: Where do you find your principal market for White Plume?

A.—St. Thomas and Brantford. I have no home market. I do not care if I ever sell a head there.

Q.—Do you store any?

A.—Yes, we have 50,000 on hand now.

Q.—Explain how you store it?

A.—I would like to get rid of most of it before Christmas; and I store it right in the muck. I run out a trench with the plow, and I put the celery in three heads wide until I get six rows with three heads in a row. I leave it like that with the tops exposed until it comes good hard freezing weather, and then I throw on four inches of muck, and leave that till it will bear me to walk over it, and then I use a little stable litter after that. I think that there is more celery spoiled in trying to keep it too warm than in leaving it a little too cold. My celery has as nice foliage when it comes out as when it goes in.

Q.—Have you ever tried celery houses?

A.—No, I never have. I was down at Thedford this summer, and there are two men there growing 30 acres, and they have a storage house that cost about $1,000. It has cement foundation and is 100 feet long. It

has a shingled roof with tar paper under the shingles. He has it high enough so that he can put overlays on the plates, and he fills the top of the roof with marsh hay, and he says he never has any frost in that house and keeps the celery in good condition.

Q.—Any ventilators in the house?

A.—Yes, big ventilators every ten feet. He has big sacks of sawdust on a pulley and he lets that hang down, and when it gets cold he just pulls that sack of sawdust into the chimney. He sets them right on the soil in that storage room. He trims the tops in the row before they are lifted, the same as I do.

Q.—Do you ever trim the tops while they are growin?

A.—I never did. I know a person that does and he says he gets a bigger head of celery.

Q.—Is it considered as good quality if grown in black muck as on high land?

A.—Some consider it is sweeter celery on the high ground. I remember I was in Toronto ten years ago, and at that time I bleached my celery with muck, and one salesman said, "Do you think that this celery is as good flavor when bleached with boards as the muck bleached celery?" Another salesman said, "We do not care about the flavor as long as it looks all right."

Mr. Rush: I think that the White Plume has better flavor when grown in muck than if grown on heavier soil.

The Chairman: What strain of White Plume do you grow?

A.—I get it from Vaughan, in Chicago. My Golden Heart I get from Angus McInnis, London. I like to buy two pounds at a time. Celery seed will germinate when eight or ten years old, and when I try it I know I am all right for seed as long as that seed hangs out. McInnis's White Plume is very good.

Mr. Rush: I think that if we can get good seed in Canada we should purchase it.

Mr. Benstead: I do, too.

Q.—Do you water the celery that you have stored?

A.—I never do.

The Chairman: Mr. McInnis, of London, is here, and he is one of the best celery growers in the province. I would like to have him address us for a few minutes.

CELERY HINTS.

By Angus McInnis, London, Ont.

I am sure it is a pleasure to be called on to address this meeting, and I will tell you as briefly as I can the way I store my celery. I simply take it up in the field where I grow it. It is grown four and a half inches apart with eight inches between the plants single row, and when I am digging I lay down sixteen feet boards, one foot wide. I stand them on top of the trench and clean out between them and bank them up, and I stack the boards along, three stacks to each board, one at each end and one in the middle; I stand the celery in the trench and I have a roof made out of three feet boards one foot wide and three feet long. I nail an inch cleat on the bottom end of this board one and a quarter inches from the bottom. I

have a cleat at the top as well as at the bottom, and when I am putting up my roof I lean them against one another, and you can lift these boards off any place you want to, to get out the celery. I make the beds from forty to one hundred feet long. We throw a little dirt on the top of these boards at the bottom. If you throw too much on you are apt to spread your bed. When the weather gets cold we put more earth on and then some litter. I grow from 50,000 to 70,000 celery every season. I grow Golden Heart for my seed. I grow my own seed, and I select it every year from the very best plants. The biggest difficulty I find is in saving the plant over to grow the seed from. Sometimes I have a failure, and do not grow any seed for several years. I only grow Golden Heart seed. The Paris Golden Yellow I buy in Paris, France.

I do not grow early celery. In starting seed, I prepare my bed in the fall and sow the seed about one foot apart in the rows. I sow a lot of seed so that I will have lots of plants. I trim them and cover it with glass, and then take off the glass and plant it out into the field. We do not transplant it or cut off the tops.

Mr. McMeans: Do you trim your celery before storing?

A.—No; I just take off the bad leaves.

Q.—Have you a good local market?

A.—Yes, I can always sell celery; more than I can grow. We have black muck soil, not very deep.

J.—Are you bothered with blight?

A.—Yes, some; on account of it being too wet I was bothered a little this year. I think salt and ashes are very good to prevent blight. I have found that the blight has been caused by fresh manure being plowed in.

Mr. Rush: Two years ago Mr. McInnis sent me a couple of barrels of celery by express; it was in big sugar barrels, and I thought there were two layers. It was away up above the barrel. It was put in my stall in the market, and the address from London was on the barrel. My son happened to be in London, England, at the time and some of the customers thought he had sent these out from England. The celery was about three feet long and bleached to the top. My customers went home, and I had telephone messages from all parts of the city to save them some of this London celery. I sent a message to Mr. McInnis to send me all the celery he had, but he was mean enough not to send me a barrel.

Mr. McInnis: Just at that time we have a great demand in London, Ontario, and I could sell 400 or 500 dozen a week. I always bank the Golden Heart for the winter. I cultivate it in the middle of September, and then take the mould boards, and I have a scraper and I pull the dirt up to the plant, and in a couple of weeks' time I go through the same operation again, and shovel it up with a shovel and bank it up good and tight. If the weather is warm and it grows, I have a scraper, and I go along and press the earth in against the celery to keep it from freezing.

Q.—Do you find cultivating the celery before the dew is off has a tendency to increase the blight?

A.—No, I do not think dry earth should be put up against the celery. If the dirt is too wet or too dry it will cause blight and the rust.

MELONS AND MELON GROWING.

By W. G. Horne, Clarkson.

Perhaps if we were told that we were to be deprived of one of the fruits we grow in Canada, and had the privilege of saying which one we could dispense with most easily, it might be the melon, although there are a great many people very fond of both kinds of melons.

We grow both the watermelon and the cantaloupes, or what are more commonly known as muskmelons. It is amusing to note the many different palates we have to cater to to satisfy the appetite for the muskmelon. Some people prefer eating them with sugar, others with salt, and some are fond of them after they have turned yellow, thinking that they are not ripe until in that condition. In this they are greatly mistaken. I think, however, that the majority prefer the melon in the natural way—ripened on good, healthy vines. I do not think that a melon ripened in any other way can be either wholesome or healthful; but there are, I presume, a great many eaten that have not been ripened in this way. What do we see shipped into Canada in the early part of the summer every year from our friends to the south of us? Cases of muskmelons by the hundreds, obviously plucked green, with stems hanging on them as long as pigtails. A muskmelon plucked with its stem attached has not ripened properly, and never will. A genuine, ripe muskmelon is one that has left the vine perfectly free from the stem, and it should leave it at the least touch or pull. A muskmelon plucked in any other way is not ripe. Yet, I presume, these melons that are shipped in this premature state are eaten, and they realize good prices. It seems to me that if our own growers sent a few contingents of that class of fruit, we would soon have our papers crying out that our melons were tasteless, and perhaps we would have the inspectors after us.

We do not know a ripe watermelon until it is cut open. It is simply a matter of judging. Some of the most experienced growers are deceived sometimes, more especially when they begin to ripen, or are in the first picking. There are two or three signs of knowing or judging when we expect them to be ripe. Some think that when the first curl or tendril next the melon is dead is a good sign, and some contend that when they crack with little pressure they are ripe. The best sign is by the sound. If your melon when tapped with the thumb or hand gives a dull, thud-like sound, it is ripe. It is likely that the other signs will be in evidence, too. The stem of the watermelon retains its hold as firmly when ripe as at any other time in its growth.

A muskmelon plucked green will, in time, turn yellow. Some varieties do so more than others, and appear to ripen more quickly, but such is not the case. They are deceiving you; it is practically the first stage of decomposition. It is the yellow ones that need the sugar and salt. If you want a good melon do not take the yellow ones. The watermelon plucked green will not deceive you from the outside by turning yellow; it simply will not ripen in any form whatever. It will gradually decay, although as green as when picked. A muskmelon is at its best for eating in the early morning, when it is nice and cool. A person who likes the musky aroma and flavor will both taste and smell it at that time, in its fullest strength.

Watermelons are eaten much the same way by all who are fond of them. They are not grown so extensively as the muskmelon. Our friends on the other side have had the inside track of our watermelon market for

years, and I presume they will hold it. It is simply impossible for us to compete with them in the growing of watermelons, as they have the advantage in climate; but I think we can grow watermelons with as good a flavor, and just as large, if we plant the right variety.

Our greatest drawback is in not being able to get them on the market earlier in the season. By starting them in hotbeds we can gain two weeks over them planted from seed in the open. The only profitable way for us to grow watermelons is for our own local markets, where we can do our own hauling of them; we find that they are too heavy and bulky to ship by express with other fruit. When a good crop is in evidence we also find the muskmelon a little too bulky to ship with the other fruit. Muskmelons are grown more extensively than the watermelon. We need not fear competition from our Southern friends in the growing of them, as they have to pluck theirs green to stand the long distance shipping, and a limited amount of that class of melon is all our market will stand. As soon as our melons appear, which have properly ripened, the American product disappears until the next season. The muskmelon needs to be eaten within three days after ripening; after that time it becomes tasteless. The watermelon will stay sweet and good for eating much longer, perhaps two to three weeks.

For growing both kinds of melons we require warm, sandy land. Melons will stand a lot of manuring. We sometimes read accounts advising manuring the hills. I prefer putting it on broadcast. It is too concentrated in the hills, and has a tendency to dry them out. All the root that need feeding are not in the hills alone. I believe that the roots extend as far under the ground as the vine reaches above the ground. I have turned them up with the cultivator much farther than I expected they would reach. That strengthend my opinion that manuring broadcast was the best way.

They also need good cultivation. You cannot very well work the land too much. While the vines are small, it is well to have your land as free from weeds as possible, as you only have a limited amount of time to keep them down before the vines begin to run. The hot seasons suit them best. They are always of a better flavor when the season is warm. They can stand dry weather for a long time if we have heavy dews at night. They do not require much rain. Too much wet weather causes the muskmelons to crack open, which renders them unfit for the market, and not much good for eating. Where the land is in good condition the watermelon should be planted at least seven feet apart each way to grow good melons. It grows a long, slender vine, with small foliage for so large a fruit. Muskmelons can be planted much closer; five feet each way is the usual distance. Three plants left in a hill is plenty. Both kinds are prolific. An acre of muskmelons is capable of producing 800 dozen; watermelons, from 400 to 500 dozen, weighing possibly some fifty tons. These estimates would be an excellent crop, but a possible one.

We have much to contend with in growing melons for the early market. It is necessary to start them in hotbeds, which means a great deal of extra work, and work that needs our closest attention, because if neglected at certain critical times you have a lot of your plants lost and your labor as well. Perhaps the most critical time in raising melon plants in a hotbed is at the time of germination, and just after they have made their appearance. The best temperature for growing melons at this particular time is from 75 to 80 degrees. In fact, this temperature is the best for them at any time; but after being planted in the open they have to stand sometimes a temperature not very far above freezing point, so that it is as well to get them used to as low a temperature as possible for a week or so before moving them out into the open field, so as to have hardy and strong.

In starting the melon in the hotbed it has to be planted so that when it is moved into the open the roots are not disturbed. Melon plants will not transplant in the true sense of the word. We have to plant either in pieces of sod or in pots, so that when moved out to the field they can be planted without interfering with the roots. Some people prefer the pots to the sod, claiming that the plant takes root quicker than those planted in the sod, on account of the sod being full of grass fibres. I have tried both, and have not noticed any difference.

There is a distinct advantage in using the sod to using the pots. The pots, for instance, have to be filled with the choicest of soil, which has to be found every time you plant, and they cannot be handled so easily as the sod when drawing out to the field. Then, again, the pots have to be cared for from one year to the other.

With the sod you simply have to cut, place closely in the frame, and plant. When drawing them out to the field, have them well soaked with water. Make your hole deep enough so that your sod will be two inches below the level. Plant it as you would plant anything else, and that is the end of the hotbed work as far as the sod is concerned. The fact of the sod containing fibres of grass holds it together and makes it easy to handle.

Insects That Attack Melons.

Insects are very troublesome and annoying at times. A man needs to be a Christian, in the truest sense of the word, to combat with them without complaining, and wondering what good they are and why they were sent to torment us. I am afraid I cannot give you their correct and proper names, as the nomenclature of the entomologist is a puzzle to me. If I did know their proper names, I would not dare to attempt to pronounce them.

There are three that generally make their appearance, more or less every year. Each one has his own peculiar way of doing his work. I cannot say which is the most detestable. They are all bad enough. The first one to attack the plants is the cutworm. Nearly every person who has had anything to do in the raising of plants is acquainted with its method of attack. It has a clean, decided way, and there is no doubting the results.

The next to make its appearance is the yellow striped beetle. Their mode of attack is different. They are lively little suckers. (Laughter.) They sometimes come in very large numbers, and if left for two or three days soon destroy a melon patch. They suck the sap from the leaves, leaving the plant a mere skeleton. We do not know of any remedy that will destroy them. We check them by dusting the plants with land plaster, putting it on in the morning when the dew is on the vines. The plaster adheres better at that time. They do not seem able to work so well when the plaster is on the leaves. If the leaves are dusted for a few times, most of them leave. There are some that stay till the blossoming is over. They are very fond of the blossom, and work in them very much, and I think that they cause the greater part of the deformed melons.

The third insect to annoy us is, perhaps the most tantalizing of the three, as well as the most repulsive. We call him the pumpkin or stink-bug. The last is the most applicable, because, when killed, the scent which permeats the air puts one in mind of that odorous animal that likes chickens. The pumpkin bug is another sucker. A plant attacked by him commences to wither and gradually dies. Its work takes place generally when you have every prospect of getting from four to six nice melons from your melon hill. Suddenly you notice your vines begin to wilt, and growers of melons know what that indicates.

We find that to realize good money for melons it does not depend altogether on their quality. Often the inferior classes of melons bring the fancy prices. Take, for instance, those shipped us from the other side. I also saw some of our own growing shipped as recently as this fall by a neighbor of mine, that were simply rubbish alongside of good melons. The grower owned to me that they were no good, but as long as he could get fancy prices for them, which he was getting, he intended to ship them. Good prices are paid for such samples simply because there is a demand for melons and few are to be had. No one who sells such melons can have any pride in shipping such rubbish. A man who has a good article to sell is proud of it. He is not afraid to meet the person he sold it to. It gives satisfaction in every way.

To grow good fruit is pleasure.

To sell good fruit is pleasure.

To eat good fruit is pleasure.

Adding the three together makes a threefold pleasure that is well worth our while trying to cultivate and bring into effect. It is simply nothing more nor less than our duty to do so.

Mr. W. T. Macoun: You say that you do not approve of transplanting in the same way as you would a cabbage plant; you do not believe that it is possible?

Q.—I never found it possible.

Mr. Adams: Last year I had some melons that failed to come, and we had plants in a pot, and we took them out and planted them in the field, the same as we would cabbage plants.

A Member: I have had them in boxes, and have planted them out without being careful about the earth.

Mr. Horne: You might do that once or twice, but to plant them extensively on a large scale you would find it would not be successful.

Mr. Adams: We planted 1,000 in that way last year. We like to put two plants in a hill. Do I understand you plant these hills by hand?

Mr. Horne: Yes.

Mr. Adams: We put them in with a cultivator, two feet apart in the row, and the rows five feet apart.

Mr. Horne: You would not cultivate them both ways.

Q.—Where does that pumpkin sucker attack it?

A.—In the stem below the ground.

Q.—What do you do to prevent it?

A.—All we can do is to catch them and kill them.

Q.—You say that the cucumber beetle is a sucker?

A.—Yes, I think it so because they leave the leaf like a skeleton.

A Member: They stick to the end part of the leaf, and I think that they eat just the same as a potato bug.

Mr. Robertson: It is the cucumber beetle, and a beetle has jaws to bite.

A Member: It bites the leaf all right.

Mr. Horne: The rose bug is said to be one that sucks, and it works on the grape vine in the same way.

Mr. Adams: We find that the rose bug in Essex will bore a hole in the peaches and get right in there.

Mr. Horne: I think that they are sucking insects.

Mr. Adams: We find that the Bordeau mixture applied to melons will drive them out.

Mr. Macoun: We find that the Bordeau mixture on melons is the best for all these insects; and it is the same with the flea beetle that attacks the potato vine. You will find that a great many diseases will start in these holes that the bugs make, and we find that there is nothing like a good coat of Bordeau mixture to get rid of them.

Mr. Horne: I think that it is proper to keep the foliage perfect in growing anything.

Mr. McMeans: The end part of the leaf is where the flesh is and it is skin on the top, and that makes it appear as if the leaf had not been open. If you will use Paris green it will drive them away very quickly. We have not had any melon bugs for two years. I think that the cold summer of two or three years ago did away with them. You will have more of them where you grow a great many melons. There is another sign to know when a watermelon is ripe. There is a rash that comes on the melon, and it is very fine, but the more rash you find the riper the melon. The best way to do away with the cut-worm is to take shorts and Paris green and molasses and mix it so that it will be moist enough to stick together in little lumps. Sow that broadcast on your land. A pail full will do half an acre. They eat it in preference to anything else. The smell of the molasses draws their attention, and they like shorts better than bran. There is no trouble in doing away with cut-worms if you do that.

Mr. Macoun: That is our plan for doing away with them. I have counted seventeen dead cut-worms around one tobacco plant.

Mr. Horne: You need to have something tempting to take them away from the tender plant just from the hotbed.

Mr. Macoun: It is as easy to transplant melons as it is cabbages or anything else. I have grown cucumbers and transplanted them just the same as cabbage.

Mr. Delworth: In Montreal they sow the seed in strawberry boxes and set them out. Mr. Williams, of Ottawa, sets them out on his benches in the greenhouse. He sows four or five in a box and thins them down to two. Mr. LeGarry, of Montreal, raises them in hotbeds. Mr. LeGarry's father has little boxes made without bottoms, about six inches square, and these boxes are set on the soil and the seed is planted in them. Mr. Williams said that at one time he thought it was good practice to break off the corners of the box to allow the roots to run. He thinks that it is better to disturb them as little as possible, and he plants the boxes in the hole and lets the plant find its own way out into the soil.

Mr. McMeans: Do you prune your melons any?

Mr. Horne: No, I believe in doing it, but we do not get any time. It is my plan to nip the ends off to allow the laterals to come on.

Mr. McMeans: It is the second lateral that brings the melon.

A FEW WORDS ABOUT OTHER VEGETABLES.

By A. McMeans, O.A.C., Guelph.

Beans. I would recommend for early, Keeney's Rustless or Wardwell's Kidney Wax. For medium, I know of nothing better than the Davis Wax, a wax bean with a white pod. Should beans be a drug on the market, and you too busy at something else, you can let it go, and get a dry, white beat for winter sale. For green, Valentine and Stringless Green Pod are both

good, and will bear pushing with your customers. The green beans are not appreciated as they should be by the people of Ontario.

Beets. I used to grow Egyptian for transplanting and Eclipse for early, but, having a variety test of fifty-five varieties at the College this season, I would add Model to the above. It is deep, globular in shape, size and season medium, color and quality good. Black Red Ball, shape nearly round, becoming angular with age, top medium in size, upright and dark in color, flesh color dark red zoned with crimson, quality good, season medium.

Cabbage. Early Jersey Wakefield for early, to be followed by Early Summer or All Head for winter. Danish Round Head (which is an improvement on Half Head), Hollander, and Diamond Winter are all good. For an extremely late, the Houser is good, but inclined to be a little coarse. (Black Rot.)

Brussels Sprouts. Improved Dwarf is good. I was much pleased to see the display of this vegetable that was made in the Exhibition Hall. This is a vegetable that will bear cultivation—that is, cultivate your market for it. Boom it. Get people to try it, till it is appreciated as it should be. I may say that on the other side of the line they are operating it. The wholesale price in New York City is from six to ten cents a quart.

Carrots. It is hard to beat the Chantenay. But in our variety test the Rubicon outyielded it. It seems to be an improved Chantenay in size. As yet I have not had the pleasure of testing it for flavor.

Corn. Early Corey, Crosbys, Kendall's Early Giant, Early Evergreen, Stowell's Evergreen, and Country Gentleman will give you a succession. For the private or amateur grower, I would say grow Golden Bartam and Black Mexican. They are both good flavor, but on account of color they will not take on the market, and yet I would advise everybody to try some of both of these varieties. A little word of caution may be given here: Be careful not to plant them near your other sweet corn, or they may pollenize some of it, causing some grains to be yellow and black in color.

Cucumbers. Corey's Early Cyclone; for early, White Spine, and for pickling, Westerfield's Chicago Pickling.

Lettuce. For under glass, Grand Rapids and Hothouse. Outdoors, Hauson. This variety is sold also under the following names: Gardener's Favorite, Nonpareil, Hamilton Market, Toronto Gem, and Excelsior. It is too well known to need description. Unrivalled is about the same as Big Boston, slightly lighter green, and without that brownish tinge on the borders. For quality, Deacon is good. It is sold under the name of Big Head, Golden Heart, Summer Gem, St. Louis Butter, Triumph, and White Russian. It is a buttery cabbage, midseason, slow to shoot to seed, head globular or slightly flattened, color light grayish green, and quality excellent. Black Seeded Simpson should not be forgotten if you prefer the loose leaf or cutting lettuce.

Parsnip. Hollow Crown is preferred by most people. I prefer the Guernsey. It is about the same in circumference as Hollow Head, but shorter, holds its size, and does not taper off as much as the Hollow Crown. It will crop out equally as well, and when you take into consideration how much easier they are to harvest it makes an extra inducement to grow the shorter variety.

Peas. Surprise, Nott's Excelsior, Gradus, and Stratagem will give a nice succession.

Radish. For forcing, Rosy Gem, Ruby Pearl, Scarlet Turnip in the turnip shape, and in olive shape I have found none better than Scarlet Coni-

cal. Outdoors, Scarlet Turnip, White Tip, French Breakfast, Chartier's Long Scarlet, Short Tip, in the reds; White Box, Long White, Vecima Icicle in the white; and Delicious in golden. All are too well known to need description. China Rose and Black Spanish for winter.

SALSIFY. Sandwich Island.

SQUASH. Summer Crookneck, Delicious, Marblehead, and Hubbard. The majority of growers make the mistake of leaving the Crookneck until the shell gets hard, whereas if they cut them when the shell was just beginning to get hard, when you can indent them by pressing on them with your thumb, you will find them far nicer. Just take them and wash them and cut up and cook. Try them this way once and be convinced. The Marblehead are not grown enough. It is a sort having a grayish white skin, with a nearly smooth surface, and is somewhat smaller in size than the Hubbard, but has less waste in preparing for the table. It is as productive and the flesh is as dry, as thick, and as good as the Hubbard, and it ripens about the same season. Delicious is a fall and winter variety, size small to medium, flesh thick dry, and of very best quality. Grow this variety when you want quality rather than yield. If the amateur wants one squash to cover as much of the season as possible let him try Delicata or Perfect Gem. Fordhook will give him one of the best flavored squashes, but it is too small to grow for the market.

I think that we should get our customers and dealers to push Brussels Sprouts. They get ten cents a quart for them in New York, and we can get that price if we educate the people up to eat them.

Mr. DELWORTH: Which Corey do you use?

A.—The white one.

A MEMBER: I want someone to give me information on the black rot in cabbage.

Mr. MACOUN: That is one of the most difficult diseases to control. A special investigation was made as to that disease at Ithaca, N.Y., and they published a bulletin on the subject about a year ago. They did not discover anything that was of much value in preventing it. They recommended that all the leaves that were left over in the field should be destroyed, and also every part of the cabbage that was wasted, and, if possible, to change the ground. The Howser cabbage is much freer from it than others.

Mr. MCMEANS: You must plant the Howser earlier than the other cabbage. I was around Nova Scotia, and the growers there thought that they could have their loaf and eat it. They were selling their cabbage and planting the stalk to grow their seed from, and the result is that they have very poor cabbage.

Mr. MACOUN: I do not think that it would be a good policy to cut the head off and then get your seed from the side leaves.

Mr. ROBERTSON: Is the original head of the cabbage used to develop the seed stalk when it is developing the seed?

Mr. MACOUN: Yes.

THE WORK OF THE BRANCH ASSOCIATIONS.

Much valuable work was accomplished during 1906 for the benefit of their members by the branch associations of the Ontario Vegetable Growers' Association. The Ontario Association has been organized so recently that as yet some of the branch associations have not got in complete working order. What promise to become two of the strongest branches—those at Ottawa and Kingston—were not organized until April, 1906.

Most of the branches hold regular meetings for the discussion of matters relating to vegetable growing, several purchase baskets, boxes, and other supplies in large quantities, and at cheap rates, for the benefit of their members, one or two hold an annual excursion and picnic in the summer and an annual banquet in the winter, which so far invariably have proved very enjoyable and successful, and a splendid means of securing new members. Through the branch associations the vegetable growers in each section are brought into close touch with one another. The Ontario Association, in turn, serves to bring the members of each branch association into touch with the members of each of the other branches throughout the Province. The Ontario Association is planning to furnish competent speakers for the meetings of the branch associations.

The following are reports of the work done during 1906 by several of the branches:

The Toronto Branch.

F. F. Reeves, Humber Bay, Secretary-Treasurer.

The Toronto branch of the Ontario Vegetable Growers' Association during the past year has been successful beyond the most sanguine anticipations of its members. We close the year with a membership exceeding 200 of the most successful and progressive vegetable growers in the vicinity of Toronto. We have had nine meetings during the year, all of which were well attended. In starting, the members decided on the first Saturday afternoon of each month for regular meetings, and instructed the executive committee to procure the best men available as speakers on subjects of interest to vegetable growers at the different meetings.

At the January meeting, 1906, interesting papers were read by Messrs. R. Lankin on "The Best and Most Profitable Way of Bunching"; G. Syme, Jr., on "The Best Way to Market Our Produce," and by J. McKay, on "Cauliflower Growing." At this meeting the executive comittee were instructed to interview manufacturers and seedsmen and obtain prices on boxes, Paris green, and bunching twine, and report at the next meeting. The committee was given power to make all arrangements for the annual banquet. The banquet was held at Webb's on January 24th. Upwards of 150 were present, including Hon. Nelson Monteith, M.P.P., Minister of Agriculture; A. Campbell, M.P., Speaker J. W. St. John, M.P.P., W. F. Maclean, M.P., W. A. Emory, George Syme, Sr., and H. B. Cowan.

At the February meeting very fine papers were read by Mr. T. Delworth on "Rhubarb Forcing," and by George Syme, Jr. on "Celery Growing." A motion was passed asking the members to report to the executive committee any failure of seeds to come up to what they had been represented by seedsmen. The committee to take any action on such reports they might deem necessary.

Prof. Harcourt, of the Ontario Agricultural College, Guelph, gave a very interesting address at the March meeting on "Commercial Fertilizers," and offered to furnish fertilizers, and instructions how to use them, to gardeners selected by the branch to conduct fertilizer tests on different vegetables. The proposition was accepted, and growers were named to experiment on onions, tomatoes, celery, potatoes, and cauliflower—four on each. The branch forwarded a request to the Ontario Agricultural College to conduct experiments to ascertain the cause of spot on beans, tomato, onion, and celery blight, smut on corn, and cabbage root maggot, and to find the best and most practicable method of combatting these diseases. The executive committee presented its report regarding the purchase of boxes, Paris green, and

twine. It reported that boxes could be procured from a certain firm at 12c. a box, to include printing, a decidedly lower price than the members had been paying; that Paris green could be secured for 18½c. a pound for Canadian, and 19c. a pound for Berger's English. Twine, three ply, they reported could be bought for 20c. a pound, and four ply for 23c. a pound. We consider this a practical example of what co-operation can do, the saving on boxes alone having been from three to four cents each.

At the meeting held March 17th two additional directors were elected on the Provincial Board. The following subjects were then taken up: "Celery Growing," by Messrs. W. Harris and S. B. Courtis; "Growing Early Beets," by A. Shuter, and "Growing Early Cabbage," by James Stevens. Messrs. J. W. Rush, A. Shuter, and C. Gibbard were appointed crop correspondents for the Toronto District.

The subjects for the April meeting were: "Growing Early Potatoes," by James Dandridge; "Growing Early Tomatoes," by James Gibbard, Sr.; "Glass in Relation to Outdoor Work," by H. E. Reed. A motion was passed suspending meetings till July.

Business in July was solely in connection with our annual excursion, which was held to St. Catharines on Wednesday, August 1st, and was one of the most successful we have ever held. Owing to the pressure of work, the August and October meetings were merely routine. Plans were made for the ensuing winter meetings. At the November meeting the members were well pleased with a paper on "Growing Early Vegetables," by James Stevens.

In closing this report, I think great credit for the successful year should be given the President, George Syme, Jr.; R. Lankin, Vice-President, and Messrs. T. Delworth, J. W. Rush, J. McKay, and W. G. Carter who, with the Secretary-Treasurer, formed the executive committee.

The Hamilton Branch.

James A. Stevens, Hamilton, Secretary.

During 1906 eleven meetings were held by the members of the Hamilton branch of the Ontario Vegetable Growers' Association, with an average attendance of about forty-five. Our total membership was eighty-one. While regular subjects relating to vegetable and fruit growing have not been discussed at our meetings in the past, it was decided unanimously at our last meeting that such subjects will be taken up and discussed by practical men at each meeting hereafter.

Prof. Sherman, late of the Guelph Agricultural College, attended our last meetings and gave valuable information regarding the best methods used for the eradication of certain insect pests. After this meeting it was decided that talks by such experienced men would prove of great interest and value to all our members.

The basket question has been of great interest, owing to the factories having combined to increase prices. Our association was not willing to abide by the advanced prices, and arrangements were made by the President, E. J. Mahony, and myself, by which the members of our association were able to save nine per cent. These arrangements were carried out, and resulted in a saving to our association of between $400 and $500. The association purchased $3,820.56 worth of baskets.

It is impossible to give any idea of the good work that has been done at our meetings. Increased interest has been taken in the last few meetings held. Before our meetings open and after the meetings groups of growers

get together and discuss matters among themselves in a quiet and interesting way, which proves profitable. We expect that the coming year will see great progress made by this branch.

The Ottawa Branch.

T. Mockett, Billings' Bridge, Secretary.

The Ottawa branch was organized on April 5th, 1906, by Mr. T. Delworth, of Toronto. Mr. F. Williams was elected president. During the year six meetings were held, and thirty-nine members joined. Owing to the mixed nationalities of the gardeners in the Ottawa District and to the hesitation of the French and Germans to mix with the English-speaking classes, we have devoted a large amount of time to inducing them to join the association. Most of the English-speaking gardeners, who are the principal growers, have joined.

A large amount of time has been given to trying to improve certain abuses on the Ottawa markets, such as the restriction of hours of buying and the blocking of the markets by hucksters' empty rigs overnight, thus holding the best positions on the markets from the gardeners. Owing, however, to the lateness of the season when this matter was taken up, it was laid over until spring, but not until after some members of the market committee had been seen and their assurances had been obtained that any reasonable suggestion or plans along that line would be favorably received.

We have written also to different seedsmen regarding their putting a percentage of the germinating power on their packages of seed supplied to market gardeners. A circular letter was sent to eight, only two of whom replied that they would do it, and then only under certain conditions. The other firms replied that it would be impossible for them to test all seeds before sending out.

This is the principal work that has been done by our branch during the past few months. We have made no plans yet for the winter meetings during 1907, but now that we are organized we expect to be able to accomplish much valuable work in the future for our members.

The Chatham Branch.

Fred Collins, Chatham, Secretary.

The Chatham branch of the Ontario Vegetable Growers' Association held five meetings during 1906, and while nothing definite has resulted, the discussions have been helpful and a better feeling prevails amongst the members. The association has discussed very thoroughly a scheme for co-operative selling. A commitee was appointed to draft a plan, and has reported as follows: That we form a joint stock company on a small scale, for the purpose of disposing of our produce, this company to be capitalized at $1,000, in shares of $25 each. The estimated annual expenditure was placed as follows: Rent, $200; horses, $75; wagons, $25; two men, $700; manager, $600; office and casual help, $275; 'phone, $25; sundry, $100; total $2,000, or 25 per cent. on $8,000 of business. While some of our members were enthusiastic over the scheme, the greater number were of a more cautious disposition. During the coming year we expect to evolve a plan for the buying of seeds and other supplies on a co-operative plan, and to conduct some experiments in vegetable culture.

The Sarnia Branch.

W. A. Broughton, Secretary, Sarnia, Ont.

The Sarnia Vegetable Growers' Association has twenty-nine members. Ten meetings were held during 1906, which were fairly well attended. Two debates were held as a social feature, and both were largely attended, especially by young people. The subjects of the debates were "Gardening vs. Farming" and "Electricity vs. Steam." The affirmative won in both cases.

There was no co-operation in the buying of supplies for the garden or farm in our association during 1906. The members of the association agreed to raise the price of potatoes to sixty cents a bushel, which price was maintained for the rest of the season.

The members of this association were much interested in the monthly crop reports furnished by the Ontario Vegetable Growers' Association, and which were a decided benefit. The association offered two prizes of $7.00 each for the best collections of potatoes (not less than half-bushel each variety), and for the best display of vegetables at the county fall fair. The former was won by the president, Mr. John Baxter, and the latter by the secretary.

In all of our meetings discussions took place on some subject of interest to all, such as varieties, methods of growing, protection from insects, blight, and so forth. Our finances are in a satisfactory condition.

PRIZE ESSAY COMPETITION.

At the meeting of the directors of the Ontario Vegetable Growers' Association, held in Toronto, June 7, 1906, it was decided to offer $125 in prizes for essays by practical growers on vegetable growing. First, second, and third prizes of $12, $8, and $5 were offered for essays on the growing of each of the following varieties of vegetables. The competition closed October 15, 1906. The judges were Messrs. W. T. Macoun, of the Central Experimental Farm, Ottawa; W. C. McCalla, of St. Catharines, and A. McMeans, of the Guelph Agricultural College. The prize winners were:

"Potato Culture"—First, W. A. Broughton, Sarnia; second, F. F. Reeves, Humber Bay; third, H. A. Blunden, Sarnia.

"Cauliflower Culture"—First, A. Knight, Cataraqui; second, T Delworth, Weston; third, J. N. Watts, Portsmouth.

"Tomato Culture"—First, J. N. Watts, Portsmouth

"Celery Culture"—First, J. Friendship, Kingston; second, George Syme, Jr., Carlton West; third, J. N. Watts, Portsmouth.

"Onion Culture"—First, T. Delworth, Weston; second, J. N. Watts, Portsmouth; third, Herbert Hachborn, Brantford.

The prize essays were read and discussed at one of the afternoon sessions of the annual convention, held in Toronto during November, at the time of the Ontario Horticultural Exhibition. The first two prize essays in each class are here published.

GROWING POTATOES FOR PROFIT.

By W. A. Broughton, Sarnia, Ontario.

(*First Prize Essay.*)

Judging from thirty years' experience, the best soil for potatoes is a rich, sandy loam, with six to nine inches of surface soil, that is well drained either naturally or by tile. Drainage is important. Potatoes do not thrive on land that is not well drained. Drained swamp or muck lands grow good crops. As many as 400 bushels an acre have been grown on this kind of land. Sandy lands require more manure than any other kind. Stiff or heavy clay soils do not grow good potatoes. A clay loam will grow a good crop if properly handled.

Preparation of the Land. The land should be plowed and disc-harrowed in August. It should be harrowed after each rain, to keep down the weeds and to clean the land. Just before it freezes, the land should be plowed again, seven or eight inches deep, if the surface soil will permit. Land prepared in this way the fall before stands the dry weather better than it otherwise would.

As soon as it is dry in the spring the land should be harrowed enough to level it, and then 25 or 30 loads of rotten manure an acre should be put on with a manure spreader. If the land were a clover sod or second crop of clover plowed under the fall before, less manure is required. The land should be plowed, harrowed, rolled, and again harrowed lightly. It is then ready to plant.

Planting. It is best to plant potatoes, both early and late varieties, as early as possible. Some growers plant the later varieties late. This is a mistake. I have found that late varieties will do better when planted early.

The best early potatoes are Early Ohio, Early Burpee, Bovee, and Early Michigan. The best late ones are American Wonder, Rural New Yorker, Empire State, Elephants, and Clark's No. 1.

A change of seed is always desirable— that is, from one kind of soil to another. Seed potatoes should be of medium size, and cut to one or two eyes. They should be planted as soon after cutting as possible. Plant them in drills from 30 to 32 inches apart and 12 to 14 inches apart in the drills, and about four inches deep.

I use an Improved Robbins' Planter, which, in one operation, marks the row, opens the furrow, drops the seed, and covers them. The machine requires a man, a boy, and a team of horses. Planting done by the machine is better than the old way of planting by hand, for the following reasons: 1, The depth is uniform; 2, the seed is put in moist earth, covered at once, and, therefore, not so apt to dry rot on account of lack of moisture; 3, the rows can be made straight; and 4, time is saved in planting, as the machine will plant four or five acres a day. The machine has a fertilizer attachment that can be used when desired. With it 400 to 800 pounds of good fertilizer can be put in the rows. This gives the potatoes a better start and insures a better crop.

Cultivation. A week or ten days after planting, the potatoes should be gone over with a weeder, the same direction as planted, to level the ridge that is left by the planter, and to kill small weeds. This operation should be repeated every few days, until potatoes are a couple of inches high. They should now be cultivated with a cultivator every week until tops are too

large to permit cultivation. For the first few times they should be cultivated deep and close to plant, but shallower and farther from plants as they grow. Hoe them before the tops get too large. At the last cultivation hill them slightly, just enough to protect the potatoes from the sun after the vines are dead.

The vines should be kept free from "bugs" by spraying with the following mixture: Two pounds of good Paris green to 50 gallons of water. For blight, they should be sprayed with Bordeaux mixure five or six times during the growing season. Apply the Paris green and Bordeaux mixture at one application.

Harvesting and Storing. As soon as potatoes are matured they should be dug. Early varieties are usually sold at once. I have used a potato-digger for eight years, and could not now do without one. The Hoover digger is the best, as it can be used while the vines are green and heavy. In digging with this digger, 8 to 10 pickers are required. From 1,000 to 1,500 bushels can be harvested in one day if the crop is good.

The pits should be made in rows, one row for every 20 to 25 rows of potatoes, and about 60 or 70 feet apart in the row, so that the picker will not have far to carry the potatoes. The potatoes should be sorted when picked, the unsaleable ones being put into bags and carted off the field, to be fed to the hogs or otherwise disposed of.

Seed potatoes should be either pitted or stored in a cool cellar. The pits should be covered with straw, with about three inches of earth on top. When wanted for market, the potatoes should be filled into bags with a potato scoop. If they are to be stored until spring, they should be put in pits; but, if they are wanted during winter, they should be put in a cool, dark, frost-proof cellar.

The pits should be made on dry ground, so that the bottom of the pits will not be wet. They should be about two and a half feet deep by three feet wide, and any length desired. The potatoes then should be put in the trench and covered well with straw, with 8 to 10 inches of earth on the straw. When hard weather sets in, the pits should be covered with a foot of manure.

THE CULTURE OF CAULIFLOWERS.

By A. Knight, Cataraqui.

(First Prize Essay.)

After forty years' experience in growing and handling the cauliflower, I find that it requires the closest attention, from the planting of the seed until the crop is sold, to secure a good profit. With a good crop there is a good profit; a poor crop gives a large deficit.

There is a greater demand for choice cauliflowers to-day than for any other vegetable. It now requires thousands of heads to meet the demand, where a few years ago hundreds would do.

The Soil. If properly prepared, any good soil will grow a fair crop. The land best adapted to growing a successful crop is a deep, rich loam that is thoroughly drained (underdrained if possible), so that it may be easily kept loose and mellow to retain moisture in a dry season.

The land should be made as rich as possible by repeated applications of well-rotted stable manure. Mix each application with surface soil to a depth

of not more than four or five inches, so as to form a rich humus that will retain moisture even in the driest season. The fall is the proper time to prepare the soil.

Growing the Plants. One cannot be too careful in selecting the seed. The best is always the cheapest. If your seed merchant gives you good seed, stick to him. I have procured my seed from the same house for years, and have always received it good and true to name. My favorite varieties are: Snowball, Erfurt, and Rennie's Drouth Resister, for both early and late crop. I grow a few Autumn Giant, but find it not so sure a header, although it produces some extra fine ones.

For early crop, sow the seed early in March in a well prepared hotbed, and sow thinly. Thickly grown plants are more liable to damp off. To prevent this, the bed should have plenty of light and air, and not be watered too often. As soon as the plants are large enough to handle, they should be potted in fair-sized pots, or transplanted into a new bed, which should be prepared several days before needed. Great care is required in setting out the young plants to prevent any serious check to their growth. A stunted plant is liable to head up prematurely and is worthless. By potting the plants we get a much earlier crop and surer heads, and that means dollars. The plants can be set in the field quite early, as they will stand considerable frost.

The seed for the late crop should not be sown before the middle of May, and should be sown thinly, in the very best soil, to get good, stocky plants. These do not require transplanting before setting in the field. Late plants require watching to prevent the cabbage fly from checking their growth. Tobacco dust or hellebore, dusted on lightly while the plants are damp, is the best preventive against them. Do not set plants too small. If kept growing rapidly, as they should be, they will be ready for the field in five weeks.

Transplanting should be done on a damp, cloudy day. I find it a good plan to take up the plants the day previous to setting in the field, leaving plenty of soil on the roots, and to place them in a damp cellar. New rootlets will start. It is a great help, as it prevents wilting. They are more easily handled and the growth is checked very little.

Cultivation in Field. Before setting plants in the field, the soil should be made loose and mellow by repeated cultivation, but not worked when too wet. For the early crop, I set the plants in rows three feet apart and twenty inches between the plants in the row. For late crop, rows the same and thirty inches between plants. Before planting, give the field a good dressing of wood ashes, so that it will be well mixed in soil by frequent hoeings and cultivation, which must be kept up until the crop is grown. Weeds should be kept down after plants are too large for cultivation, by hand pulling or hoeing, as the crop needs all the moisture the soil will give it.

The green worm must be kept off. Paris green or hellebore is a sure preventive. I prefer using the latter, as many customers object to the use of Paris green. If necessary, go over the field several times. Begin in time. They are sure to ruin the crop if not effectually dealt with.

As soon as heads begin to form, great care is required in tying up, to protect them from the sun, wind, and dust. Perfect heads are what we should aim to get. From them we derive the profit. The tying should be so done that it will be easy to see when the head is ready to cut. Good judgment is required. It is better to cut a little early than too late. Young, tender heads are more saleable. More are consumed if taken to market young than later. If danger from frost threatens, the leaves should be tied more closely. This will protect the heads from a certain amount of frost, say, seven degrees.

When the growing season is over, all plants that show signs of heading should be pulled and placed in the roothouse. Remove all leaves that are not required to protect the head, but leave the roots and soil that lift with the plant. Stand them as closely as possible and bank up the outer side. You will thus have nice, small heads for a long time after outside heads are done.

Marketing. When marketing, the heads must be handled with care, so as to reach the consumer in a perfect condition. I use a crate holding three tiers, 12 in each. The crate is partly open, so that the buyer can examine the contents. For shipping, use large barrels. Wrap the heads with paper and pack firmly, so that they cannot move.

TOMATO CULTURE, INSIDE AND OUT.

By John N. Watts, Portsmouth.

(*First Prize Essay.*)

Successful tomato culture under glass depends as much on the man in charge as on conditions. Eternal vigilance and the exercise of good judgment on the part of the grower are more essential than strict adherence to set rules.

Strong bottom heat, plenty of light, and a large volume of pure air are important conditions. They are best secured in a large, well ventilated house. Tomatoes often are successfully grown without bottom heat, but the period of maturity is much delayed.

To make the best use of the house, two crops should be grown during the season. This will bring each crop on at a season when the expense of heating, during a part of the time, will be light. Plants for the first crop should be started as early as August—that is, if the bulk of the crop is desired for the holidays. For the second crop, seed should be sown about November 1st. The plants will then be ready to replace the first lot when the fruit is off in January.

Many growers have been well pleased with the practice of laying down the vines and allowing them to take root after the first crop is picked, and thereby forming a succession of fruits on the old plants. The plants are treated in every way as for outdoor culture till handled the last time.

Growing Tomatoes Outside. Among the many varieties of tomatoes that are grown in the field, it is difficult to say which is the best marketable variety. Much time has been spent experimenting for the discovery of some early variety. I find that no variety gives more satisfactory results in this district, for earliness and yield, than the Earliana. The best late varieties for home use and market are Plentiful, which gives general satisfaction, but not as early as some others—Success, Perfection, Purple Dwarf, Favorite, and a number of others.

The preparation of land for tomatoes is much the same as preparing for many other crops. Many people claim that tomatoes do not need high cultivation. To my mind, tomatoes require one of the highest grades of cultivation of any vegetable that is grown for market purposes. The soil must be well fertilized with rotted manure, which should be put on in the fall. Avoid stiff, hard, clay land, as it has a tendency to spoil the crop in a wet season. Soft loam or sandy loam, well enriched, or black land, gives the best results.

My reason for advocating the use of well enriched soil for tomatoes is that the bulk of the crop is forced into a marketable size, while the moisture is in the land. Should dry weather set in before the crop has had a chance to develop, the fruit and crop will be small. Often a first-class strain of tomatoes is condemned more for the want of proper cultivation than the qualifications of the variety.

Sow the seed about the end of March or the first week in April. When the plants are three or four inches high, transplant into quart strawberry boxes. These are placed in a hotbed, with a nice, steady, growing temperature, with about three inches of soil in the bed. When the plants are all in, cover the boxes so as to prevent drying out by the sun. They are left there until the danger of frost is over.

When planting in the field, run a deep furrow with the plow, in which set the plants four feet apart each way, allowing room for sun and cultivation. Break the corners of the boxes as they are put in the furrows, and thus prevent the disturbing of the roots. Draw the soil around the plants with a trowel, to keep them in position until all are planted. Then use the horse and cultivator and complete the work. The crop will be ready for summer cultivation in a few days.

By planting in squares, it gives one a chance to work both ways with the cultivator. It thus lessens labor, reduces expenses, and increases the profit.

For harvesting, the bushel crate, such as is commonly used, is the most satisfactory package for handling tomatoes. I have stored the fruit in a cellar or roothouse for several weeks after the frost has destroyed the vines.

GROWING, HARVESTING, AND STORING CELERY.

By J. Friendship, Kingston.

(First Prize Essay.)

Celery is one of the most profitable crops that the market gardener grows, providing he has land suitable for its culture. It can be grown on almost any good soil, but on some the crop will not pay for the labor. The soil I prefer is one that is always mellow, and does not get too wet or too dry. Such land is found in a hollow, where, in former years, may have been a small lake, whose bed is now covered with rich humus, 12 to 20 inches deep, with a blue clay bottom. Such soil will retain moisture, and, if properly drained, seldom gets too wet. On such soil celery can be grown at one-quarter the cost of that grown on stiff or harsh soil. On proper soil the work, from start to finish, is easily done. Where such soil is not available, the land must be made as near as it is possible by plowing and the working in of several dressings of good, rich, well-rotted stable manure. The harsher the soil the more humus is required to make it mellow. When the soil is in this condition it should be well ridged in the fall, so that no surface water can remain. In the spring it should not be worked until dry. It then should be well worked and kept mellow until planted. It is a hard job to set out from 25,000 to 50,000 celery in stiff, dry soil.

Growing the Plants. In growing the plants, the best soil that can be secured is necessary. Celery seed is slow to germinate, and should be kept shaded until it appears above ground. Cover the seed very lightly, and keep the soil moist, but not wet. The plants are hardy, but grow slowly. Weeds

grow much more quickly, and should be removed as soon as seen. As soon as the plants form the second leaf, they can be set in another bed, if you prefer transplanted plants. If not, they should be thinned out, so as to get strong, rooty plants. The majority of gardeners do not use transplanted plants. They prefer setting direct from the seed bed, unless they intend growing celery for summer use. For that purpose, the seed should be sown in March in a well prepared hotbed, and, when large enough, removed to another bed, setting them three inches by two inches, so as to form good plants.

There is great danger of celery plants running to seed if they receive a severe check in growth. Great care is required in the setting and growing. I have seen nearly the whole setting of early celery lost by it running to seed. Late sowing should be done about the first of May or later. Late sown seed needs the same care as early. The soil requires to be kept moist. It dries out much quicker in May than in April.

Setting in Field. The quickest and easiest method for setting is the best. Open trenches with a plow, four feet apart and about 10 inches deep, so that when plants are set they are only a few inches below the level. The celery does much better this way than in deep trenches, and requires less labor. I set the plants close, not more than six inches apart, so that a 30-rod row will hold 1,000 plants. By having everything in readiness a man, with two smart boys, can set out 25,000 in a short time.

Cultivation. Celery must be kept growing steadily to get crisp, tender stalks. It requires more cultivation than other vegetables. The ground must be kept loose and mellow, so as to keep up the growth and make it easy hilling up. This should not be done too soon. The plants should be allowed to grow to a fair size before the banking or bleaching is done. At this time the gardener appreciates the value of the fine, loose soil aforementioned. With it he can do his work well and with pleasure. My plan is to bank as much as I can with the horse. I use a shovel plow, which pushes the loose soil up under the leaves, almost as well as a man can do it by hand. Then two men, one on either side, with hoes 20 inches long, or scrapers, as they are generally called, shove the soil still more firmly against the plants. They work together so as to keep the plants in place. It is light work, and the field can be gone over quickly. Then leave the celery to bleach until danger of frost.

As soon as ground becomes cold, bank up the plants until covered, taking care to keep stalks straight. Before heavy frost, cover with coarse horse manure. In this manner the celery will continue growing, and, when used, will be very crisp and tender, but will not keep long.

Harvesting and Storing. For digging the crop, which should be done before a heavy frost, use the horse, and plow a heavy furrow from each side of the row. Have the plow so arranged that it will cut close to plants without injuring the stalks. This leaves them loose enough to pull by hand.

When storing leave the roots on, but remove all old or useless leaves. For long keping, celery needs close trimming, and requires a dry, cool storehouse. Place the plants in an upright position, as close as possible, so that it will continue bleaching without wilting. For immediate use, keep the roots damp, so that the growth will continue, making that nice, crisp celery so much called for during the holiday season. The most profitable kinds to grow are White Plume and Golden Paris, for early; Giant Pascal, for medium or early winter; and Rennie's Winter, for late keeping.

ONION CULTURE FOR PROFIT.

By T. Delworth, Weston.

(First Prize Essay.)

For profitable onion growing, select a soil containing rather more sand than clay, clean and free from stones and other obstructions to cultivation. The location should be cool and damp, yet free from stagnant water, either above or below the surface.

We will assume that the soil is in good tilth, having had clean cultivation and been well manured for some years previous, as an attempt to grow onions for profit would be useless unless soil in that shape was available for the purpose. Start operations in the fall by applying a good dressing of stale manure, say 40 or 50 tons an acre, and plow it under. Let it freeze for the winter without harrowing.

In spring, as soon as the soil is dry enough to work, go over it with a spring-toothed cultivator or disk harrow, and thoroughly stir and pulverize it, to get the manure well incorporated with the soil. Harrow as fine as possible, and if the soil be dry enough, finish with a planker. Then drill in the seed.

At this point there is an important question to decide. Where land is cheap and labor scarce, some growers adopt the plan of throwing the soil up in light ridges, about 24 inches apart, sowing the seed on those ridges and cultivating with a horse. For market gardening in close proximity to large cities where land is expensive, in a high state of cultivation, and rich from many years of heavy manuring, I consider that method wasteful of the land. I prefer to get the soil as fine and level as possible, and then drill in the seed in rows as straight as may be done and about 15 inches apart, using about six pounds of seed to the acre, and then cultivate with a wheel-hoe.

The selection of varieties is a matter that may be affected by local market conditions. In Toronto an onion is wanted with a bright, yellow skin and white flesh. In some cities a fair demand exists for red onions, but there is little or no demand for them in Toronto. Onion growers practically are unanimous in the opinion that, as long as seedsmen will give them a good strain of seed of Yellow Globe Danvers, they are getting the best onion on the market for ordinary domestic use.

Cultivation. As soon as the seed is up so that the rows may be seen, start the wheel-hoe. Use the flat-cutting blades, and keep them sharp. Cultivate shallow and frequently. Follow with hand weeders and clean out the rows. For this work I prefer a weeder that we make ourselves out of a table knife, heated and bent round and sharpened on both edges. Don't allow the weeds to get large. A few days' smothering at this stage will do the crop irreparable damage.

Should thinning be necessary, do it with the weeding knife while they are small. Onions do not take kindly to being loosened at the roots in warm weather. It stunts their growth. Keep the wheel-hoe going till the onion tops get so large that you cannot get through them. Then use a flat or Dutch hoe, and be careful not to cut the onion. Cultivate often and very shallow; keep the hoe sharp, and barely skim the surface.

Diseases and Insect Pests. The onion crop has at least two enemies that are sometimes very destructive. The first is the Root Maggot. This insect usually does its work in the month of June or early part of July.

Various methods of combatting it have been suggested, but so far no practical and reliable remedy has been found. It is usually worst in light soils. Its method of injuring the crop is too well known to need description.

The other pest is known as Onion Blight. It is a fungous disease that appears usually in August, when the onions are about half grown. It shows as patches of grayish-white mildew or mold on the foliage. The foliage turns black and dies when the blight appears. The disease spreads rapidly, a few days being enough to turn a mass of healthy foliage into a few dried and blackened tufts. Spraying with Bordeaux mixture has been tried without much success. The writer made a few experiments last summer with dry air-slacked lime and sulphur (1 of sulphur and 5 or 6 of lime), dusted over the onions while wet with dew. The results were encouraging, but not conclusive. Next year the experiment will be repeated.

Harvesting. As soon as the onions begin to ripen, pull them at once. The time may be determined by pulling a few. When an onion completes its growth, the roots begin to die, and they lose their hold on the ground. The onions pull easily. Onions become spoilt for keeping if not harvested promptly. Pull and lay in windrows. Turn several times in the sun until dried. Then, if wanted for long storing, carry them in with the top that does not break off in handling still adhering to them. They will keep better when stored in that way.

As they can be topped when they are picked up in the field quicker than at any other time, those that are wanted for immediate use should be tipped as they are gathered. Never handle onions when wet. Store in a dry and cool place. Do not store in deep piles. I have kept them in good shape until April, when spread out five or six inches deep on shelves in a dry cellar.

EARLY POTATOES.

By F. F. Reeves, Humber Bay.

(Second Prize Essay.)

For growing a crop of early potatoes I prefer a sandy loam soil, facing south or south-east, and sheltered as much as possible from the north winds. As the majority of gardeners use green manure, it is best to plow in a good coat the previous fall. The manure thus is well rotted and incorporated in the soil by spring. If the manure is plowed in in the spring it has two bad faults—first, there is a tendency to cause the potatoes to scab; and, second, if we have a dry, hot summer, it causes the land to be too loose, and consequently dry out far sooner than it would do were the land more solid.

The potato most generally grown by vegetable growers in the vicinity of Toronto is the Ohio. The reasons for this are generally known. This variety combines two features that commend themselves to the grower. One is its extreme earliness, and another that when you start to dig, the tubers are practically all marketable. Some growers are using the Eureka. I think it is a few days later, although when it comes in it is a heavier cropper. Quick Lunch or Noroton Beauty will, I think, when more generally known, run the Ohio very closely in popularity.

Many growers start a part of their early potatoes in a spent frame, or greenhouse. We usually start ours the first or second week in March. In forcing for earliness it is well to remember that a whole potato will crop

earlier than a cut one. I prefer them the size of a hen's egg, with the seed end cut off. The potatoes should be cut to the size wanted before placing for sprouting. We usually lay boards on the bench or frame where we want to sprout them. Sprinkle about an inch of soil on the boards, place the potatoes (cut down) on the boards, as close as they will lie, and when this is done, cover them nicely with soil. The boards prevent the roots from taking too great a hold on the soil. If allowed to do this, they receive a check when taken up. Care must be taken in planting to see that the roots and sprouts are not broken.

As soon as the ground is fit to work in the spring, it should be well disked and harrowed. Shallow furrows, 30 inches apart, should then be run out. If the furrows are left open for a few days it will be a great advantage, as it will enable the sun to warm the soil. The date of planting varies in different sections of Ontario, but should be done as early as one can get on the land without packing it.

In planting, it pays to place the set right side up. If this is not done the sets that happen to fall sprout up, and thus have an advantage of fully a week over the others. This is, to a large extent, the cause of the crop coming up irregularly. When the sets are in, we go along the rows with a hoe or rake and pull sufficient soil over to cover nicely. In about two weeks the weeds appear. It is wise, then, to start the scuffler going. The scuffling should be done every week till the tops are large enough for moulding. After moulding, it will be necessary to pull out only the large weeds. Great care should be taken in scuffling not to go deep close to the rows, as if the potato roots are disturbed it means a great loss in the crop.

In growing potatoes, as in all other garden crops, insect pests and blight have to be taken into consideration. One has to get after them early and stay right with them. As far as the ordinary potato bugs are concerned, the liberal use of Paris green will keep them in check. Many growers use the pure Paris green, put on dry with a Paris green gun. Others use a solution of one ounce of Paris green to two gallons of water, put on with a watering pot or spraying machine. The best way to use it is to mix one pound of Paris green with one bushed of land plaster, or air-slacked lime, and sprinkle on the plants when the dew is on them. I like this way the best because the use of either land plaster or lime is very beneficial to the foliage, causing it to remain green and vigorous for a longer period. When this can be done it increases the yield.

The question of fighting the potato blight, or mildew, is a difficult proposition. During 1906 I tried Bordeau mixture, using the formula as given in Bulletin No. 122, issued from the Ontario Agricultural College, Guelph, in 1902:

Copper sulphate (bluestone)	4 pounds.
Quick lime (fresh)	4 pounds.
Paris green	4 ounces.
Water	40 gallons.

The bluestone and lime were dissolved in different barrels. I used an auto-spray, and started as soon as the potatoes were nicely above ground, and sprayed every two weeks till the potatoes were ready to dig.

So far as checking the mildew, or rot, was concerned, it was a total failure. In writing this essay I have had in view the fact—which I think largely influences vegetable growers—that it is necessary to get the first crop off the ground as quickly as possible. If this can be done in the second or third week in July, it practically ensures the success of a crop of either cabbage or cauliflower.

CAULIFLOWER GROWING.

By T. Delworth, Weston.

(Second Prize Essay.)

One of the first requirements in the growing of any crop is a suitable soil. For cauliflower I prefer a rich, deep loam, neither sand nor clay, but a pretty even mixture of both. While the cauliflower is sometimes grown successfully on swamp or muck soils, I would never award such soils first place for cauliflower growing. A nice, sweet upland of a soft, loamy texture, thoroughly pulverized and aerated, generally will give stronger and healthier foliage, and flowers of a better and finer texture, than will swamp soils. The plants are, also, much more liable to stem rot on swampy land, particularly in a wet season.

Cauliflower, being a crop particularly susceptible to damage by drouth, the greatest trouble on the upland is to prevent its dying out in a long-continued spell of such weather as we had in August, 1906.

Assume the soil to be suitable, if the land is fairly level, and there is not much snow, we commence operations in the winter by applying about 50 or 60 tons of manure per acre, preferably cow manure. In the spring, as soon as the land is dry enough to work properly, we go over it with a disk-harrow, thoroughly chop up the manure, break it up fine, and incorporate it with the soil.

About the middle of May plow the ground about five or six inches deep and harrow down fine. Go over it with a harrow or spring-toothed cultivator every week or so, working shallow to keep weeds from starting and prevent a crust forming and drying out, continuing this until you want to set out the plants, which with us is usually between June 20 and June 30. If the weeds have been kept down and the soil worked as described, the ground will be loose, pliable, and, even in the dryest season, damp, and the manure in such shape that the plants can use it at once.

A good crop of cauliflower generally will return as much money per acre as any other. That being the case, I consider it poor policy to try to snatch another crop first. It robs the money crop. It is a safe rule in gardening that one good crop is more profitable than two medium ones.

The most popular varieties of cauliflower are those of the Erfurt type. This includes a large number of other so-called varieties, among them being Henderson's Snowball. Brill, in his work on cauliflower, pronounces it "one of the best of the Erfurt type." But our seedsmen have juggled so with the names of cauliflower that it is impossible to say much about any variety without an actual test of a sample of the seed offered. I have had Seafoam, Whitehead, Giltedge, Henderson's Snowball, World's Best, and Earliest Dwarf Erfurt growing side by side in alternate rows, and would unhesitatingly pronounce them varieties of the same type. In fact, in many cases the only difference discernible was in the name and price of the seed. I believe that the list might be made much longer with the same result; but, under whatever name it is sold, a good strain of Erfurt is, I think, the most profitable and reliable on the market. The Danish Dryweather, as I have tested it, produces a flower distinct in type from the Erfurt and not nearly so good. Buy the best seed you can get, irrespective of price.

Do not sow seed too thickly. Do not keep plants too long in the seed bed. I prefer a plant rather small, sturdy, with a stem about 1½ to 2 inches long, and the seed bed kept dry.

When ready to set out, give the bed a thorough soaking with water an hour or so before pulling plants. This will prevent loss of rootlets, and the plants will not wilt as quickly as they otherwise would.

Then go to the field and plow and harrow as fine as possible the soil on as much land as you intend to plant that day. Do not prepare any more. We plant Erfurts in rows 30 inches apart and plants 24 inches apart in rows. Always transplant into freshly stirred soil. The soil, being freshly turned, loose, fine, and damp, it does not take long to do the planting. We rarely lose plants in transplanting. We have dispensed with watering in the field. The plants take root so quickly in the fresh soil that they hardly know that they have been moved. In the last ten years we have never watered in the field. It is a very expensive and laborious job, which often does more harm than good. As soon as the plants get a start, go through them with a cultivator and hoe. Repeat every few days to keep the weeds from starting and to prevent a crust from forming on the surface. Keep this up till the cauliflowers get too large to let the horse go through. By that time the foliage will shade the ground so that cultivation will not be necessary. The flowers then will be forming and the leaves will need tying up. Do not do this too soon. Do not tie up till you have to do it to prevent the sun shining on their heads. Then draw the leaves together and tie them loosely well above the flowers. The proper stage at which to cut them will have to be learned by experience. Do not leave them too long; quality is better than size.

Sell your crop from the field, if possible. Should you have some that are not sufficiently developed, and they are in danger of being spoilt by frost, cut them off close to the ground, break off all the outside foliage, leaving just enough to protect the flower, carry in and lay on the floor of your cellar. I have had beauties at Christmas that were kept in this way.

CELERY GROWING.

By George Syme, Jr., Carlton West.

(Second Prize Essay.)

In order to have good celery you must have a good strain of seed, which should always be tested the year before. I consider early celery the most profitable. The seed should be sown in the hothouse about the last week in March. If sown earlier it is apt to go to seed. Fresh soil should be put in the hothouse before sowing, with about half an inch of clean sand on top, to keep the seeds from damping off.

As soon as the seed comes up it should be well aired and transplanted. It should be planted one inch apart each way, and kept growing till it is ready to plant in the field. Before moving from the bed it should be well watered, so that the plant will have lots of root. The plants should be sorted, to get all of them, as far as possible, of the one size.

The land, where celery is planted, should be prepared in the fall. It should be of a damp nature, but not wet, and should be drained so that no water is allowed to stand on the top. Manure the land well in the fall and plow deep, leaving the land up in ridges so that it may not become sour. The land should be plowed at least twice in the spring and before harrowing. A good fertilizer may be used the last time. Harrow the land level, then use a roller or plank, to give it a smooth surface. The land should then be marked out in rows three feet apart. Each row should be tramped solid before plant-

ing, so that the roots may have a better chance to strike. It should not be plowed the last time until the plants are ready to be put out. The plants should be put from eight to ten inches apart, in single rows, as they are kept clean much more easily. Too many plants should not be put in at once. It is better to have one patch coming in after the other.

After the plants get hold of the ground they should be cultivated with a harrow-toothed cultivator two or three times a week, going narrower each time. When it is impossible to get through the rows without destroying the rootlets, stop cultivating and remove the weeds by hand or by a wheel-hoe; run lightly over the space between the rows.

When the celery is fit to sell, it should be bleached with boards not higher than the celery, because if the tops are bleached it spoils the appearance of the celery. The boards should be laid down close to the roots and raised up gently, bringing up all the stems until the top of the board becomes bound in the leaves. By this method no stakes are required to hold the boards.

Celery should not be allowed to become too white before it is cut, as the substance goes back into the root. It should be cut a little on the green side and allowed to get white while packed in a box or crate. When celery is cut for market it should be washed as soon as possible. The dirt should be removed without much rubbing, because if the outside skin is broken it becomes rusty and loses its appearance. After being washed and rinsed it should be packed in crates laid flat, reversing each row until the crate is filled. Crates holding from five to eight dozen give the best satisfaction. By this method of packing the retailer can always have the celery crisp and fresh, and can buy enough to last for a week at a time.

Late or winter celery should be sown in beds in the open air as soon as possible and transplanted into the field about July 1st. It should be worked about the same way as early celery, only it should be planted a little further apart. It should be plowed up in the fall and allowed to stay out as long as possible. without getting it touched with the frost. Winter celery may be kept very well in trenches dug one spade wide and deep enough to let the celery come even with the top of the ground. Cover this with a board one foot wide. When the weather becomes cold, cover it with a litter of straw manure. The straw litter holds the frost even after the weather has become warm. Another way to keep celery is to built a roothouse for the purpose. Stand the celery straight up and pack each row with sand. About six inches up have a window or door at each end, so that at any time you may allow a current of air to pass through to dry the moisture. The bottom or ground should be of a damp nature, so as to supply nourishment to the plant. It should be kept at a temperaure of about 33 degrees, and never allowed to freeze. It should be repacked once or twice during the winter, and all decayed leaves removed.

ONION CULTURE.

By John N. Watts, Portsmouth.

(Second Prize Essay.)

One of the most sought after vegetables is the onion, and one of the best varieties is the Danvers Yellow Globe. This variety has been developed and much improved of late years. Loamy land yields bountiful crops of onions after it has been enriched for a few years by liberal dressings of manure.

Most farmers have found by experience that rich soil must be had for the crop, and, furthermore, that constant cultivation and weeding must be kept up during the growing season. Our onion growers here sow the black seed in April. The ground is manured in the autumn or the spring, or, what is better, at both seasons. It is worked and thoroughly harrowed and cultivated until reduced to a fine tilth.

The seed then is drilled in in rows one foot apart, using about four to five pounds of seed to the acre. To ensure a knowledge of the fertility of the seed the seed should be put into a large glass jug about half full; then fill the jug with water, and in a few minutes all the good seed, that is of a germinating quality, will sink, and the remainder, that is sold to us gardeners as fresh, reliable seed, will be quickly identified as light seed. Those seeds that float are worthless, having lost their vitality. Onion seed should be fresh, as if it is more than a year old it usually is nearly worthless. The foregoing is a sure way of testing.

As soon as the small plants can be seen in the rows, run the wheel-hoe between the latter. Boys are often engaged to remove the weeds and stir the soil by the dexterous employment of the fingers within the rows themselves. This work is continued at greater or lesser intervals throughout the season. Our best farmers aim to "wheel-hoe" their onions once a week, not only to kill the weeds, but to stimulate rapid growth of the crop. The onions are pulled early in September, and allowed to lie in the sun for a few days.

They are turned by a stiff broom or stable brush occasionally, which removes all the loose skins and prevents any bruising of the onion. The sun's rays should be enabled to develop, on all parts of the onion, that bright straw color so much desired. Let the onions lie on the ground until cured, then draw them to the barn floor or some other airy place, and spread them thinly. Some growers market their crops in the fall, while others hold theirs for higher prices.

One dollar a bushel is deemed a fair average market price, and at that figure onions, probably, pay our farmers and gardeners as well as anything they can raise. Five hundred, or even six hundred, bushels of onions are often produced upon an acre of good Danvers land, but 400 bushels may be considered a good, fair crop.

Should the crop not be all sold in the fall, they can be stored on shelves, made of slat-work that is open enough to admit air through the bottom of the shelves. Keep them in a cool, but dry, cellar, to prevent growing, and it is beneficial to stir them occasionally.

Of recent years many gardeners have tried to grow large onions by sowing the seed in hotbeds about March and transplanting them in the open ground as soon as the land can be worked. By this method onions have been raised many of which weighed over one and one-half pounds. These win the majority of the premiums at the fall fairs. They do not, however, possess the good, keeping quality of onions grown outside from seed.

CITY REGULATIONS GOVERNING THE SALE OF VEGETABLES.

During July, 1906, the secretary of the Ontario Vegetable Growers' Association sent the following circular to the branch associations:

The following information has been gathered in regard to by-laws in cities regulating the buying from market gardeners or farmers by dealers in cities before a specified hour each day. This information has been obtained at the request of the members of the Kingston branch, who recently wrote

the Ontario Association stating that a by-law had been passed by the Kingston City Council preventing dealers buying from gardeners or farmers before 10 a.m., and that three prosecutions had been made. The City Clerk in the following cities were written to and asked for copies of any by-laws passed by their municipal councils in regard to this matter. The following replies have been received:

The cities of Toronto, London, Hamilton, and Cornwall have no by-laws prohibiting dealers from buying vegetables from market gardeners or farmers before a specified hour in the morning.

Brantford. "No person or persons shall buy, forestall, or engross any provisions, food, or produce on the market place of the said City of Brantford, or upon any of the public streets of the said City of Brantford within one hundred yards of the said public market for the purpose of buying or proposing to buy or to inspect any such article for the purpose of reselling the same or any part thereof until after the hour of 9 o'clock a.m., between the first day of April and the first day of November, and after 10 o'clock between the first day of November and the first day of April, inclusive. The penalty for any infringement of this by-law is a fine not exceeding twenty dollars and costs."

Windsor. "All persons bringing game, fish, poultry, meat, eggs, butter, vegetables, grain, hay, straw, fruits, farm produce, small ware or other articles to the city for sale or other disposal before 10 o'clock a.m. shall proceed directly to the market, without hawking the same upon the streets or elsewhere in the city, and shall pay the market fee, if any, required by law, provided the vendor of any article brought within the city in pursuance of a prior contract for the sale thereof may, without hawking the same upon the streets or elsewhere in the city, proceed directly to the place of delivery thereof under such contract, and provided always that farmers and other producers may sell such articles at stores and shops within the municipality at any hour of the day. No person shall buy, sell, or offer for sale game, fish, poultry, meat, eggs, butter, vegetables, grain, hay, straw, fruits, farm produce, small ware or other articles exposed for sale or marketed within the city elsewhere than on said market place, until after the hour of 9 o'clock in the forenoon between the first day of April and the first day of November, and until after the hour of 10 o'clock in the forenoon between the first day of November and the first day of April, save as hereinbefore provided; and provided, also, that this by-law shall not affect the purchase or sale of any of said articles in a bona fide store, shop, or other similar place of business. The penalty for a breach of any of the provisions of this by-law is a fine not exceeding fifty dollars for each offence, exclusive of costs."

Peterborough. "No huckster, grocer, butcher, or runner shall on the market place or in the market building, or on any of the streets or public places in the Town of Peterborough purchase or offer to purchase any meats, fish, roots, vegetables, poultry, dairy products, eggs or articles required for family use, and such as are usually sold in the market, before the hour of 10 o'clock in the morning, and no person shall forestall or monopolize any such articles in the Town of Peterborough."

Chatham. "Our market by-law prohibits dealers from buying on the market for the purpose of re-selling up to the hour of 10 a.m. Dealers do not like it, but it is enforced."

St. Catharines. "No butcher, huckster, or dealer, his or their servant or agent, or any person on his on their behalf, shall, directly or indirectly, purchase or cause to be purchased from any farmer or other person in the said market grounds (except beef by the quarter), any meats, fish, fruits, roots,

vegetables, poultry, dairy produce, eggs, or such articles are are usually sold in the public market for the purpose of selling again, before the hour of 9 o'clock in the forenoon between the first day of May and the first day of November each year, and before the hour of 10 o'clock in the forenoon during the remainder of the year; nor shall any butcher, huckster, or dealer, his or their servant or agent, or any other person on his or their behalf, act as the servant or agent of any other individual in the purchase of any of the articles enumerated or referred to in this section for the purpose, and in the manner aforesaid, before the hours aforesaid."

KINGSTON. "No person shall be guilty of the offence of forestalling, regrating, or monopolizing within the city, of oats, meats, fish, fruits, vegetables, poultry, or dairy products, eggs or any article required for family use, or such as are usually sold in the market, brought into the city for sale, and no person shall buy any of the said articles, except for his own family use, before the hour of 10 o'clock a.m., and no butcher, grocer, huckster or runner shall purchase any of the said articles in any of the public markets, or in any other part of the city, from persons bringing such things into the city to be sold or marketed before the hour of 10 o'clock a.m., and no person knowingly shall sell any of the said articles to any butcher, grocer, huckster, or runner in any of the said markets, or elsewhere in the city, before the hour aforesaid, and notwithstanding that such articles are in any of the said instances sold or bought for export from the city, and no butcher, grocer, huckster or runner shall, before the hour of 10 o'clock a.m., in any of the said markets, or elsewhere in the city, go to any wagon, sleigh, or vehicle in which articles are exposed for sale, to bargain or offer for the purchase of or make a standing offer of a price for any article to be paid to the vendor in case the vendor fails to sell such article to another purchaser at a higher price, or shall keep back or hinder other persons from purchasing, or shall crowd or throng them while purchasing, and any butcher, grocer, huckster, or runner so doing or refusing to desist and go away, or otherwise acting contrary to this section, shall be deemed to be guilty of a breach of this by-law, and be punishable accordingly."

OTTAWA. "No butcher, huckster, grocer, or runner shall, on any pretense whatsoever, before the hour of 9 o'clock in the forenoon during the months of October, November, December, January, February, and March, or before 8 o'clock in the forenoon in April, May, June, July, August, and September, purchase or contract for, or cause to be purchased or contracted for, or offer to purchase or contract for, any of the following articles when brought to the public markets of the said city for sale, to wit: Potatoes, butter, eggs, fresh meats, fish, fruits, roots, vegetables, poultry, and dairy product, nor any other articles required for family use, and such as are usually sold in the markets, live stock and grain excepted."

CONSTITUTION OF THE ONTARIO VEGETABLE GROWERS' ASSOCIATION

(*As Amended During* 1906.)

Preamble.

The objects of the Ontario Vegetable Growers' Association shall be to advance the interests of the vegetable industry in all its branches.

(*a*) By holding an annual convention for the consideration of questions relating thereto.

(*b*) By co-operating in every way possible with the branch Associations hereinafter provided for.

(*c*) By collecting, arranging and disseminating useful information.

(*d*) By co-operating in promoting the educational work of the Ontario Department of Agriculture.

(*e*) By awarding premiums at Horticultural Exhibitions.

(*f*) And by such other means as may from time to time seem desirable.

Constitution.

1. The Association shall be called The Ontario Vegetable Growers' Association.

2. The officers of the Association shall be a President, a first and a second Vice-President, a Secretary, a Treasurer, or a Secretary-Treasurer, and Directors to be appointed as hereinafter provided, who shall constitute the Board of Directors.

3. Any person may become a member by the payment of $1.00 per annum, payable in advance, and a payment of $10.00 shall constitute a member for life. Members joining the Association thus shall not be entitled to representation on the Board of Directors.

4. An annual convention shall be held each year at such time and place as may be designated by the Directors.

5. The Directors may appoint an Honorary President and an Honorary First and an Honorary Second Vice-President, but such persons shall not have the power to vote at the meetings of the Board of Directors.

6. The election of directors shall take place each year, at the meetings of the branch Asssociations (hereinafter provided for and as defined in Clause 25, governing branch Associations), the newly elected Directors to assume their duties and responsibilities at the close of the said meetings.

7. The Directors shall, at the first meeting of the Board, and afterwards whenever necessary, appoint from among themselves a President and a first and a second Vice-President.

8. An annual meeting of the Board of Directors shall be held each year, at least one month previous to the date set for the annual meetings of the branch Associations. At such meeting the directors shall prepare a statement of the year's work as outlined in Clause 11, for presentation at the annual meetings of the branch Associations.

9. The Directors, also, shall appoint from among themselves, or otherwise, a Secretary and a Treasurer, or a Secretary-Treasurer, who shall remain in office during pleasure.

10. The Directors may elect from among themselves an Executive Committee, not exceeding five members (including the Secretary), which shall have the right to conduct such business of the Association as the Directors may, by resolution, specify, of which committee three shall constitute a quorum.

11. At each annual meeting of the branch Associations the retiring Directors shall present a full report of their proceedings, and of the proceedings of the Provincial Association, and a detailed statement, for the previous year, of the assets and liabilities, and of the receipts and expenditures of said Association, and a statement of membership and such general information, pertaining to the Provincial Association, as the members of their branch Associations may desire.

Quorum.

12. Not less than five members shall constitute a quorum to transact business for the Association.

13. (1) At least two weeks' notice shall be given previously of each general or annual meeting, naming the time and place of meeting. Notices must be mailed to each director by the Secretary.

(2) A meeting of the Executive may be held on shorter notice, provided every member is otherwise notified and consents thereto.

Duty of Officers.

14. It shall be the duty of the President to preside at all meetings of the Association, decide all questions of order, and make suggestions he may deem necessary in the interests of the Association, and he shall be an ex-officio member of all committees appointed. The President shall remain in office until his successor is appointed, and he shall attend the first meeting of the new Board of Directors.

15. It shall be the duty of the Vice-Presidents to aid and assist the President. In the absence of the Prsident his powers and duties shall devolve upon the first and second Vice-Presidents in the order named.

16. It shall be the duty of the Secretary to attend all meetings of the Association and keep correct minutes of the same; conduct all correspondence, and issue all press and other reports; prepare the report of the Executive Committee for the annual meeting; forward the list of representatives to the secretaries of the Fair Associations, and prepare for publication the annual report. He shall have the power of Managing Director, acting under the control and with the approval of the Board of Directors. The Secretary shall call the first meeting each year, of the new Board of Directors, within six weeks after the date set for the annual meeting of the branch Associations. By virtue of his office he shall be a member of each committee appointed.

17. The Treasurer shall receive and account annually, or as often as may be required by the Board, for all moneys belonging to the Association, which shall be deposited in a chartered bank approved by the Association, and he shall pay by cheque all bills and accounts that have been approved of by the Executive.

18. All receipts and expenditures of the Association for the year shall be audited before the annual meetings of the branch Associations, by an Auditor to be appointed, on the request of the Association, by the Minister of Agriculture, expenses of such audit to be borne by the Association. A true copy of such Auditor's report shall be presented at the annual meetings each year of the branch Associations.

19. This Constitution may be amended or revised by a majority of the members present at an annual meeting, provided a notice of motion of such change has been given in the notices calling the meeting, or at a special meeting of the directors of th Association called for the purpose of considering the same.

PROVISIONS FOR THE AFFILIATION OF BRANCH ASSOCIATIONS.

Preamble.

The objects of the branch Ontario Vegetable Growers' Association shall be those set forth in the preamble of the Ontario Vegetable Growers' Association.

20. A branch Association may be formed in any part of Ontario.

21. Each branch Association shall be called The ..... branch of the Ontario Vegetable Growers' Association

22. The membership fee of each branch Association shall be $1.00 per annum.

23. Local Associations may affiliate with, and become branches of, The Ontario Vegetable Growers' Association when they have a membership of ten, upon the payment to the Treasurer of the Provincial Association of 50 cents per member, which payment shall constitute the members of said Associations members of the Provincial Association, shall entitle them to free copies of the official organ of the Association, to free copies of the report of the annual convention, and such other printed material as may be issued by the Provincial Association, and shall entitle each branch Association to representation on the Board of Directors of the Provincial Association upon the terms defined in Clause 25.

24. The annual meetings of branch Associations shall be held during the first week of December each year

25. Branch Associations, at their annual meetings, shall appoint Directors of the Provincial Associations as follows:

(*a*) A branch Association having at least ten members but less than fifteen shall appoint one director, but the expenses of said director when attending meetings of the Board must be paid by the branch.

(*b*) A branch Association having fifteen members and less than twenty-five shall appoint one director, whose expenses, when attending meetings of the Board, shall be paid by the Provincial Association.

(*c*) A branch Association having more than twenty-five members may appoint one director, whose expenses when attending meetings of the Board, shall be paid by the Provincial Association, or may appoint one director for every twenty-five members of the branch, but on condition that the Association shall pay the expenses of only one Director for the branch while attending Board meetings.

(*d*) At all Board meetings of the Provincial Association the Director or Directors present, representing any branch, shall have the right to cast one vote for every twenty-five members of their branch.

THIRTY-SEVENTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY OF ONTARIO

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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190-

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Entomological Society for 1906.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto 1907

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LIST OF CANADIAN MEMBERS OF THE ENTOMOLOGICAL SOCIETY.

Province of Ontario.

Abbott, Dr. A. R.....Toronto.
Albright, W. D.....London.
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Dod, F. H. Wolley.....Millarville.

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Bush, A. H.....“
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Russell, John.....Digby.

SASKATCHEWAN.

Croker, A. J.....Redvers.
Willing, T. N.....Regina.

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Cockerell, Prof. T. D. A.....Boulder, Colo.
Cresson, Ezra T.....Philadelphia, Pa.
Edwards, William H.....Coalburgh, W. Va.
Howard, Dr. L. O.....Washington, D. C.
Scudder, Dr. S. H.....Cambridge, Mass.
Smith, Prof. J. B.....New Brunswick, N. J.
Uhler, P. R.....Baltimore, Md.
Webster, F. M.....Washington, D. C.
Wickham, Prof. H. F.....Iowa City, Iowa.

LIFE MEMBER.

Saunders, Dr. William.....Ottawa.
(Director of the Experimental Farms of the Dominion.

Entomological Society of Ontario

1906.

To the Honourable Nelson Monteith, Minister of Agriculture:

Sir,—I have the honour to present herewith the Thirty-seventh Annual Report of the Entomological Society of Ontario for the year 1906. It contains the proceedings of the Forty-third Annual Meeting of the Society, which was held at its new headquarters in the Ontario Agricultural College, Guelph, and also papers on practical and descriptive entomology which have been prepared for the information of farmers, fruitgrowers and gardeners as well as others who are interested in the work of noxious and beneficial insects.

The Canadian Entomologist, the monthly magazine published by the Society, has been regularly issued during the year, and has now completed its thirty-eighth annual volume. It continues to maintain its well-established reputation for scientific entomology.

I have the honour to be, Sir,

Your obedient servant,

CHARLES J. S. BETHUNE.

Ontario Agricultural College, Guelph. Editor.

Entomological Society of Ontario.

OFFICERS FOR 1906-1907.

President—James Fletcher, LL.D., F.R.C.S., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa.

Vice-President—Tennyson D. Jarvis, B.S.A., Lecturer in Entomology and Zoology, Ontario Agricultural College, Guelph.

Secretary—E. J. Zavitz, B.S.A., Lecturer in Forestry, O. A. College, Guelph.

Treasurer—S. B. McCready, B.A., Professor of Botany and Nature Study, O. A. College, and Macdonald Institute, Guelph.

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Curator—J. Eaton Howitt, B.S.A., Lecturer in Botany, O. A. College, Guelph.

Directors—Division No. 1—C. H. Young, Hurdman's Bridge.
Division No. 2—C. E. Grant, Orillia.
Division No. 3—J. B. Williams, Toronto.
Division No. 4—C. W. Nash, Toronto.
Division No. 5—George E. Fisher, Burlington.
Division No. 6—J. A. Balkwill, London.

Directors—(Ex-Presidents of the Society)—Professor Wm. Saunders, C.M.G., LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms of the Dominion, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., Guelph; W. Hague Harrington, F.R.S.C., Ottawa; Professor John Dearness, Vice-Principal Normal School, London; Henry H. Lyman, M.A., F.E.S., F.R.G.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., Levis, P.Q.; Professor Wm. Lochhead, B.A., M.S., Macdonald College, Ste. Anne de Bellevue, P.Q.; John D. Evans, C.E., General Manager Central Ontario Railway, Trenton.

Auditors—B. Barlow, B.S., and H. S. Peart, B.S.A., Ontario Agricultural College, Guelph.

Editor of the "Canadian Entomologist"—Rev. Prof. Bethune, Guelph.

Editing Committee—Dr. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; Prof. Lochhead, Ste. Anne de Bellevue, P.Q.; G. E. Fisher, Burlington; J. B. Williams and C. W. Nash, Toronto.

Delegate to the Royal Society—A. F. Winn, Montreal.

Entomological Society of Ontario.

ANNUAL MEETING.

The forty-third annual meeting of the Entomological Society of Ontario was held in its new headquarters at the Ontario Agricultural College, Guelph, on Wednesday and Thursday, October 10th and 11th, 1906; the sessions were presided over by Vice-president Dr. James Fletcher, Dominion Entomologist and Botanist, Ottawa. Among the members present were Mr. John D. Evans, Trenton, the retiring President; Mr. Henry H. Lyman, Montreal; Mr. Arthur Gibson, Central Experimental Farm, Ottawa; Mr. C. H. Young, Hurdman's Bridge; Dr. Brodie and Messrs. C. W. Nash, J B. Williams and Paul Hahn, Toronto; Mr. G. E. Fisher, Burlington; Mr. J. Fred Smith, San Jose Scale Inspector for Ontario; President Creelman, Professors Hutt, McCready and Bethune, Messrs. Jarvis, Zavitz, Eastham, Howitt, Barlow and Peart, of the Ontario Agricultural College and the Macdonald Institute. Letters expressing their regret at their inability to attend were received from the Rev. Dr. Fyles, Levis, P. Q.; Professor Lochhead, Macdonald College, Ste. Anne de Bellevue, P. Q.; Mr. A. McNeill, Chief of the Fruit Division, Department of Agriculture, Ottawa; Messrs. J. A. Balkwill, W. E. Saunders and John Law, London; Mr. W. D. Kearfott, Montclair, N. J.

Owing to the lateness of the train from the east, there was only time for a brief meeting of the Council on the morning of the 10th, at which some necessary business was transacted.

In the afternoon of Wednesday, October 10th, the Society met at 2.30 o'clock; owing to the large attendance, over a hundred being present, the meeting was held in the spacious Massey Hall. The proceedings began with a discussion on the Codling-worm.

THE CODLING-WORM DISCUSSION.

Dr. Fletcher, the chairman, opened the debate by giving an outline of the life-history of the insect, the extent of its ravages and the ordinary methods of dealing with it. The following is a condensed summary of his remarks:

The Codling Moth is probably one of the most injurious insects that we have to deal with in Canada in fruit work. The remedies are all well-known, and are all sufficient, if a proper amount of care is taken by fruit growers. However, it is neglected by many, and I think the present state of the apple crop of this year is very largely due to fruit growers and farmers generally not having paid attention to the regular remedies which they ought to have made use of and not keeping their orchards clean and free from the codling moth as well as they might have done. A great deal of work and care are requisite, and as its habits vary somewhat in different parts of

Canada, it is necessary to know its life history. In my own observations I have found that east of Toronto, or about Toronto, there is practically only one brood in the year, while west of Toronto there are two. This means that in Western Ontario the fruit grower has a different and harder task before him. In Eastern Ontario, having only one brood to deal with, it can be practically controlled by the spring spraying, which everybody seems to have energy enough to carry out. West of Toronto, it seems necessary to supplement the work of spraying by banding the trees with burlap, or other material, giving the caterpillars a shelter in which to spin their cocoons, and then destroying them before the moths emerge. Where spraying and bandaging the trees are faithfully carried out, the Codling-moth is very materially reduced in numbers. But notwithstanding all that is done, the apples going to market every year are to a large extent damaged by this insect, and the unsightly appearance of the apple with injury on the side or at the calyx end reduces its selling value. We thought, therefore, that it would be advisable to have a discussion this afternoon upon this important insect pest, as in every conference of this kind some fresh points of value are sure to be brought out. It is no exaggeration to say that at least one-quarter of the loss sustained by fruit-growers every year is caused by the Codling-worm, and therefore it is a matter of great financial importance that we should learn the best and most effective methods of dealing with this pest.

Dr. Fletcher then described the proper methods of spraying fruit trees and applying bandages, and stated that, if fruit-growers would faithfully adopt this cheap means of dealing with the insect, they would save a very large amount of their income derived from orchards.

He next referred to the parasites which, in many instances, effectually keep down the insect enemies of crops. It often happens that a particular insect is extremely abundant one year while the next year few are to be found. This reduction in numbers is largely due to the work of parasites. Dr. Brodie, of Toronto, has for many years made a special study of the Codling-moth and of the parasites which affect it and a number of other injurious insects. He will tell us this afternoon what he has done in this direction and the results of his investigations. The introduction of a new parasite from some other part of the world is a very difficult matter and requires long continued efforts in order to secure satisfactory results. The introduction of the *Vedalia cardinalis* into California to destroy the Cottony-cushion scale is probably the only marked instance of successful work of this kind which has ever been brought about. It is hoped that the efforts now being made to establish a parasite of the Codling-worm in California will be successful; there are great difficulties to be overcome, and it will be some time before the parasite will become sufficiently numerous to control this enemy of the fruit. The study of parasites covers a field of very excellent and useful work, but up to the present time there have not been many practical results.

Dr. Brodie, before reading his paper, stated that he was a firm believer in the good results to be obtained through parasites. Dr. Bethune was the first person in North America to advocate the introduction of parasites to keep in check the imported insects that ravaged our wheat fields. His own recollections went back to sixty years ago when the Codling-worm was utterly unknown in Ontario; apple trees were then very large and productive. It was not till somewhere about 1858-1860 that it made its appearance. During the last ten years he had been pursuing rather carefully the study of this insect, taking in the larvae, breeding them through the winter and discovering to what extent they were attacked by parasites. He found it a very

difficult matter to procure a sufficient quantity of material for study, that is, of the larvae and pupae, during the different seasons of the year, and had never been able to get a satisfactory supply. Dr. Fletcher has told us that if the remedies prescribed, which are well known, were fully carried out, the insect would be kept well under control; he entirely agreed that these methods are the most rational and successful for combatting the ravages of the insect. Prevention by parasites has long been discussed and surprise has been expressed that their influence for good has been practically nothing. This failure, he believed, was largely due to the counter influence of secondary parasites which have an extended geographical range. He then read the following paper:

PARASITISM OF CARPOCAPSA POMONELLA.

By Dr. W. Brodie, Toronto.

The all important problems of parasitism, as means for checking the increase of plant eating insects, have for more than half a century been much in entomological literature, and it seems that parasitism is recognized everywhere as the great power arranged by nature to check the rapid increase of plant eating species.

The parasitism of the Codling-moth has not been overlooked. Several species of primary parasites have been detected and identified, and surprise is often expressed that their influence for good is so little, we may say inappreciable. Now there may be several reasons for this; it may be the primary parasites we know are not the species arranged by nature to check the over increase of the Codling-moth. But one special reason I have detected is the presence of a secondary parasite, namely, *Dibrachys boncheanus*. This insect has a wide geographical range in Asia, Europe and North America, and although one of the smallest insects, exercises an immense influence in the world of insect life as a checking and balancing-up power. So far as known to us, it is without doubt an injurious insect, as most secondary parasites are.

On Aug. 28, 1905, I received from Mr. W. A. Peer, Freeman P. O., a small box containing 18 *C. pomonella* larvae and pupae.. On Aug. 29, there emerged 2 moths, 1 primary parasite, *Pimpla pteralis*, and 12 secondary parasites, *Dibrachys boncheanus*. Sept. 20, 1905, a package from Stayner gave from June 2-10, 1906, 17 moths and one primary parasite, a Pimpla. Sept. 25, 1905, a package from Prescott, gave in June, 1906, 4 moths and 2 primary parasites, 1 Pimpla, 1 Ephialtes. I may say that I am indebted for identifications to Dr. Ashmead, of Washington, acknowledged to be the highest authority on parasitic Hymenoptera in the world.

During the many years in which I have been engaged in working out some of the problems of parasitism, I have found the primary parasitism of the Codling-moth to be about 0.5 per cent. No doubt it would be much greater were it not for the presence of the secondary parasites. In a further pursuance of the many interesting, practical and important problems presented, such as the life histories and relations of the primary and secondary parasites known to infest the larvae and pupae of the Codling-moth, and the relationships of these to allied species, preying abundantly on numerous species of Tortricidae, more or less common in open woods and thickets

everywhere throughout the Province, a careful comparison of the hosts and habits of our native species with closely related foreign ones would be of very great value. This might result in the importation of species more potent for good than our native ones.

In order to arrive at a satisfactory solution of the many problems involved in the investigation of this subject, an ample supply of material, larvae and pupae of the Codling-moth, must be at hand at all seasons, collected in many localities throughout the Province.

Surely the magnitude of the interests involved, and the rational claims of the indicated scientific method are such as to justify a sufficient effort by entomologists and fruit growers in determining the efficacy of parasitism in effectually overcoming the Codling-moth pest.

Dr. Brodie went on to say that the parasites he referred to are well-known, having a wide range over the United States and Canada. He had obtained them from the north, east and west of Ontario. The secondary parasite is exceedingly small, less than one-sixteenth of an inch, and on looking back he thought that his precautions were not sufficient, and that these minute creatures may have escaped detection. In pursuing an investigation of this kind, it is necessary for the worker to carefully fix his jars or bottles in such a way that these very small insects may not escape, but be retained for observation. The jars used should be small, but yet large enough for the atmosphere not to be too moist; they may be covered with cheese-cloth or some other thin material. This is a very important subject and should form an attractive field for work, affecting as it does our largest fruit industry.

Prof. Hutt said that he had travelled over a considerable portion of the Province this summer and found the Codling-worm exceptionally bad, especially in the Niagara district and the eastern part of Ontario. In some orchards half the crop was destroyed. It was now making its appearance in Algoma, and had this summer made some headway on St. Joseph's Island. It needs careful watching in order to keep it in check, as it is covering all sections where apples are grown. If parasites are of use in reducing the numbers of the pest, they are not increasing fast enough to control it to any extent. Something more than parasites is required, and that is the employment of the established remedies by the fruit-growers themselves.

Mr. C. W. Nash said that the question of dealing with the Codling-worm was one of the greatest possible importance. As matters now stand, we are simply covering the ground with trees that to a great extent give us little in return. The remedies spoken of by Dr. Fletcher are certainly very easy of application and always show good practical results, provided that these remedies are applied thoroughly and at the proper time. The great difficulty that we find in dealing with the farmer is that he either does not believe in the practicability of these remedies, or he does not apply them just when he should. In the first place, with regard to spraying, as referred to by Dr. Fletcher, some men will spray their trees just when they happen to have the time to do so, without regard to the state of the fruit, or the tree, or the stage of the insect. In many cases where spraying is done at the wrong time, it is just money thrown away. If spraying is to be efficacious at all, it must be done before the larva has entered the apple. To catch them just at that particular time requires observation and the exercise of some little judgment. The codling moth deposits its eggs near or upon the little apple as it is first formed, about the time the petals drop from the blossoms. Those who have observed apples will have noticed that the little embryo apple stands erect upon the stem with the calyx expanded. A few days after

the petals have fallen, the stem curls over, the apple hangs down, and the calyx closes. If you spray after this has taken place, you are simply throwing away material, as there is no chance of its getting into that little calyx cup. To do your spraying, then, so that it should be efficacious, you should spray as soon as the petals fall, while the apple is erect. You then have a chance, a good chance, but even then nothing more than a good chance, of getting a small portion into the calyx cup. If you do, when the larva goes into the calyx cup and makes its first meal with the intention of entering the apple, it is very likely to be its last. Very little poison will be necessary at that time. The insect is remarkably weak and small. You cannot, however, hope to get a little poison into every apple on the tree, some will be missed and escape. But that is the point you must bear in mind, to spray at the proper time. Having done that and reduced very largely the number of larvae that are in your apples, you should supplement that treatment by afterwards bandaging the trees. If you do that, the probability is that it will not be a very great tax upon the product. A farmer in my neighborhood has a large orchard of old trees. He sprayed at the proper time, and he thought by so doing he had done everything that was necessary, and others had told him the same. I told him to bandage his trees as well, that it is much better to be safe than sorry, but he ridiculed the idea. So I took an old bag and did it myself, and eight days afterwards I went back. We took that bag off and there were seventy-two cocoons beneath the bag. These are the two remedies that are certain.

Another point to consider, and this is one that I think you should take into your deepest consideration, and that the government should enforce. It is that every man who has apple trees should be compelled to take precautions against the Codling-worm. A man who has large interests at stake will undoubtedly make some effort to protect his property, but the man on the small village lot with a few straggling trees—what does he care? The result is that these few scattered trees here and there enable cocoons to mature in a sufficiently large proportion to provide codling-moths for the whole Province. It has come to this, that unless a man will take care of his trees he should not be allowed to have them. I have tried myself for very many years to find out if there is any parasite affecting the codling-moth likely to be of any service. I have consistently failed to do anything of the kind. It was very rarely that I ever found a parasite. It may be that in some sections and in some seasons they are abundant. The parasites will have to be more abundant to show their effects, but so far as the codling-moths are concerned, I think you will have to look to your own efforts to reduce them. The very nature of the moth makes it almost exempt from any attack by insect parasites. It is practically exempt from any injury by outside enemies. In the pupa stage it is destroyed by birds. If we had more trunk-cleaning birds the orchards would have fewer codling-moths. You should take into consideration some means of compelling persons who maintain apple trees to look after them, or else see that they are prevented from keeping them.

Dr. Fletcher said that the experience in this country of trying to control people by legislation proved that such efforts were almost entirely useless. Now, the question of whether it is worth while to spray or not is one, I think, I need not discuss. All evidence and statistics show that it does pay to spray, and instead of losing 75 per cent. of the crop you can save it, as an average. At most the cost of spraying trees the number of times that it is necessary is less than 25 cents for large trees, and the number of bushels you will get off them will more than pay that expenditure many

times over. The present year, with a short crop in many sections, shows that the benefits to those that have sprayed will be enormous, and these are just the years when the work is most effective. The crop is small, it requires less expenditure for handling and shipping, and more than that, the sample is finer. When orchards are properly sprayed one inspection is sufficient to, at any rate, gain the sympathy of any fruit grower with spraying. He will spray every year after that. As to the advantage of spraying an orchard regularly, the benefits are very marked. At Ottawa, the horticulturist at the Experimental Farm now knows that he cannot afford not to spray. He has learned now to spray effectively, and the advantages are shown by the fact that for the past eight or ten years the codling-moth is almost unknown in these orchards, and I can get no specimens there. How far do you think I have to go to get specimens of the codling-moth? Just beyond a sixty-foot row of trees. I canot find any codling-moths in our own orchards on the Farm, but need only go to these trees outside to get all I want. That shows the local benefit to the man who sprays, and it shows that although the codling-moth flies, it does not fly to such long distances as to impair the benefit to the man who sprays; while he who does not spray must pay the price that his loss entails.

In addition to the benefits from the remedies already referred to, it is most advisable to exercise the greatest care in examining and cleaning out any barrels or cases used for packing fruit which are brought in from outside sources and which may have contained infected fruit, as these may contain cocoons of the codling-moth. He had now at Ottawa cocoons of this insect with larvae still unchanged which were spun in July, 1905. A very few moths emerged in August, 1905, many in June, 1906, and some would not emerge till the spring of 1907. This, he thought, was a new fact in the life-history of the insect.

Mr. G. E. Fisher: In regard to treating any troublesome insect, I always find it worth while to look for a remedy. With the farmers there seems to be a difficulty about spraying. As a rule, fruit-growers do not like to spray, and a great many do not spray, and the reason is because they have never done it. Now, I am a little surprised that in all this discussion regarding the codling-worm no reference has been made to the hog remedy. In a large orchard that I am familiar with, there are 2,000 apple trees in bearing, and there are any amount of moths. As a rule, an apple tree can well spare some of its fruit. The trees are better without it. Those apples that are attacked will fall to the ground, then we want about fifty hogs in an orchard of ten or twenty acres to follow up these apples and pick and eat them, and so destroy the worms. Dr. Fletcher has already explained the second brood that does the damage in this country. The first is a benefit by reducing the superabundance of fruit. If we can follow up those apples that fall, we have a remedy that is very easy to apply, will work out very satisfactorily indeed. A great many people seem to think that apples are of no advantage to hogs. I knew a man a few years ago, and he had a lot of apples and hogs. I told him to turn his hogs into his orchard, and he stated that he thought they would get too thin if he let them run, but finally he put them in, and the first thing he knew his hogs were too heavy to sell. They were beyond the limit. He has said ever since that there is an advantage in apples in connection with hog-feeding. I have found the hog remedy a very useful one, and perhaps you would scarcely think it, a hog has a very acute hearing, and if the ground is at all hard (we cultivate in the early part of the season), I have seen a hog's ears stand up when an apple fell and he would listen a moment and then go and find that apple, perhaps a hundred

yards away. Another thing in connection with hogs, they are pretty good scavengers. I have noticed hogs follow a caterpillar along the ground, and wait until he had caught up and then eat it. They clean up the insects very nicely.

DR. FLETCHER: You mean pigs, not old hogs, do you not?

MR. FISHER: I mean growing pigs.

DR. FLETCHER: Did you find that the pigs rooted too much?

MR. FISHER: No difficulty in that way. On different occasions the orchard was sown with peas and before the peas were ripe the apples were falling. The pigs not only ate the peas and apples, but plowed the ground as well.

MR. T. D. JARVIS exhibited some apples that were affected by the codling-worm, and spoke first of the good work performed by woodpeckers in puncturing the bark and extracting the larvae from their winter quarters. He then gave an outline of the life-history of the insect at Guelph, stating that about fifteen per cent. of the first brood of worms pupate in the summer, and the moths that come from them produce a second brood. The remainder pass over to the next year. There is thus at Guelph a very limited second brood.

DR. FLETCHER said that this percentage is very interesting as showing that there is a small supplementary brood of fifteen per cent. at Guelph. The locality is thus included in the western part of the Province where double-brooding to some extent exists. At Ottawa the proportion of early maturing moths is between two and five per cent., varying in different years. These moths lay eggs and a few larvae come from them. In the country west of Toronto—at Erindale on the Credit for instance—there are two regular broods, and very few of the first brood pass through the winter as caterpillars. These variations in different parts of the country are points which the Entomologist has to be on the watch for. He was much interested in Mr. Jarvis's account of the value that he placed upon the work of woodpeckers.

MR. PEART said: I have not been in the east, but in the western part of the Province, along the Detroit River, and going through the Niagara District, and also at Oakville, the Codling-worm was worse this year than I have ever before seen it. No particular pains had been taken with spraying as a rule, but in those sections where spraying was done at all carefully and at the right time, there have been marked results. It was owing to the scarcity of labor that spraying was not done. It is a very good object lesson to notice the effect in the district where spraying was practised, and compare it with those where it was neglected.

MR. ZAVITZ said that apple-growers in County of Durham had made enquiries regarding an insect that attacked the calyx end of the apple, but did not penetrate into the fruit. He wished to know whether there was any other insect that did this, or was it the codling-worm?

DR. FLETCHER replied that there are two other insects that attack the apple—the Plum-moth *Semasia prunivora*, Walsh, called also the Lesser Apple-worm in British Columbia, and a small caterpillar in the Province of Quebec. The latter bores under the skin and works near the surface, destroying the value of the apple for packing and shipment.

MR. JARVIS suggested that the insect referred to by Mr. Zavitz might be the second brood of the Codling-moth, but Mr. Zavitz thought not, as it simply worked around the head of the apple.

MR. FISHER: In regard to the right time to spray for Codling-moths, Mr. Nash said that the bee people were very anxious that the prohibition

should include the entire period of bloom. But the Government would not allow that, and the Act read "during the period of full bloom." It has been my experience that you cannot get after the codling-moth any too early, and it is desirable to spray before the blooming is entirely completed. We think this is correct.

DR. FLETCHER: I do not personally; have you seen the moth or eggs before the blossoms have fallen?

MR. FISHER: Yes, I think so.

DR. FLETCHER: At Ottawa the moth does not appear for 8 or 10 days after the blossoms have disappeared. In Nova Scotia I have found fresh eggs on apples as large as marbles.

MR. FISHER: We find better results from spraying before the bloom is entirely completed.

DR. FLETCHER: But you have not found the moth or eggs?

MR. FISHER: I think so.

DR. FLETCHER: That is an important point.

MR. FISHER: I have not been doing any packing of fruit, but those who do pack fruit say that our pears have no codling-moth this year, while apples are badly affected. Pears have escaped the attack. Is this the general experience?

MR. JARVIS: At Guelph we made examinations and found plenty of the codling moths in the pear, but did not notice whether it was less abundant than usual.

MR. FISHER: Our pears are usually pretty wormy, and it is very disappointing to have to throw out a nice large pear for the sake of a small hole. In previous years we have lost quite a large quantity.

MR. JARVIS asked what varieties of pears are most abundant this year? Is the Flemish Beauty free from worms?

MR. FISHER replied that there is a good pear crop this year, and that he believed the Flemish Beauty to be free. It might be of interest to mention that some Clapp's Favorite pears were shipped from Burlington to Glasgow this year successfully; they went through safely and sold at a high price.

DR. BRODIE: I should like to say that very few people have ever seen the eggs of the codling-moth. I have been fortunate enough to see them. The process is this, the egg was laid at the lower part of the apple; it is very small, of course. In about an hour after hatching the larva had moved to the upper part of the apple and commenced making holes. I think it has been mentioned that the larvae eat the skin of the apple. This is a mistake; larvae bite a hole in the skin, but do not eat the portions bitten out; they are laid aside and very little is swallowed. In about a day they are buried in the fruit and they immediately turn around (my own experience) and close up the opening with silk. Six species of parasites have been described in North America. These parasites thrust their ovipositors into the larvae through the opening made by the worm. We all know that there is about two or three days' difference in the emergence of the larvae from the egg. A large number, say 10 or 20 per cent, perhaps, will come out in the beginning and another proportion at the end of the week. If you wished to follow it up, you would have to be spraying continually. The larvae do not emerge all on the same day, perhaps not in the same week. Larvae that have come out of the same brood will be apt to emerge at different times.

DR. FLETCHER: The time of egg-laying and hatching is a very important point. The old accounts state very positively that the egg was laid in the calyx of the apple, and that in spraying you had to get your Paris Green into that cup. Later observations by Professor Washburn, in Oregon,

show that the eggs are laid on any part of the apple, and Mr. Simpson found as many on the leaves as on the fruit. The main benefit from spraying is not so much that you get the spray into that cup, because the caterpillars begin life both on the leaves and fruit. They crawl about a little and then penetrate the fruit. I have seen them when they first get into the cup of the apple; they have there a place to get a purchase to make the first hole, and they are able by pressure upon the opposite side to penetrate the skin. The egg is exceedingly minute and like a little fish's scale, perfectly flat and silvery. It does not stand up as a prominence on the side. To see it you must take the apple, hold it sidewise, and look against the light and it will shine as a fish's scale. The young caterpillar hatches from that and crawls about on the apple. It is, of course, a very small insect and requires attention and time to see it. Most crawl towards the calyx end. With the second brood, the injury is often where two apples come together. At Ottawa we have come to the conclusion that with us the proper time to spray, if only one application is made, is not only not during the time of bloom, but not until even a week after the blossoms fall. The eggs are laid upon the young fruit. Nearly all apples when they are in the flowering stage are covered with a thick down, and the egg of the moth cannot be affixed to the side at that time. This is simply a matter of observation. The laying of the eggs certainly continues for over a week after the apple has formed. We never found an occasion where it was necessary to spray trees for the codling-moth during the time they were in bloom.

Mr. Crow inquired whether there is any satisfactory way of killing the second brood.

Dr. Fletcher replied that bandaging the trees is the most effective method. By that means many caterpillars can be caught and destroyed. Spraying has some effect, but not so much as in the case of the first brood, because the foliage is so much thicker, rendering the work more difficult.

Mr. Jarvis said that he had conducted experiments with bandages, and on one occasion found about 300 worms under a single bandage in two weeks' time. He began about the middle of July. The number of worms under a bandage varied very much.

Dr. Fletcher considered this too late for beginning and recommended the early part of the month for commencing to bandage. It was no doubt the most effective method of preventing injury from the second brood.

Mr. Caesar said that he had been this summer with Mr. Tweddle, who has an orchard of about 70 acres; and he was going to ask the same question as Mr. Crow. What time is it necessary to begin spraying to get the best results in preventing the second brood of the insects? They sprayed this orchard about three times in the early part of the season, and then did not spray again until about the 20th of August. He noticed in looking over the apples (Northern Spy) that they would probably have about thirty-three per cent., or more, of them affected by the moth. He wondered whether if they had been two weeks earlier this loss might have been prevented. As for bandaging, with an orchard so large it was almost impossible for them to do it. He thought they would do better to give the time to spraying. He wished to know what is the estimated cost of bandaging.

Dr. Fletcher: The question is a matter of expenditure and returns. If it pays, it does not matter if you pay $1,000 to bandage if you make $2,000 out of it. For the returns that you get from it, bandaging certainly pays, and it must not be forgotten that the very word spraying was unknown twenty years ago. Mr. Fisher will remember the first old Robertson pump, made at Grimsby. Now thousands of pumps are sold every year,

and more people buy them every year. Mr. Tweddle would have made it pay if he had bandaged his trees. The most important question was whether he could get the actual labor necessary. It certainly will pay if you destroy the caterpillars, for they destroy the fruit.

Mr. Jarvis: Was the orchard sprayed the previous year?

Mr. Caesar: It was sprayed during the past three or four years. There are twenty-five acres in the orchard. It was little pruned and had been overrun with the canker worm. $3,000 was made out of the orchard, so he thought it paid to spray. As to pears, he saw very few of his pears affected by the codling-moth.

Dr. Fletcher: The question of the exemption of pears this year is very interesting, and I can only suggest that it has something to do with the season. The effect of the seasons on insects is sometimes very much more apparent than on plants.

Mr. Jarvis: What was Mr. Tweddle's experience in bandaging? Why has he given it up? Did he use burlap?

Mr. Caesar: The real reason was the difficulty in getting labor. Mr. Tweddle spoke to me and said he would like to bandage a number of his trees. We prepared a quantity of bandages of simply coarse sack material, with the intention of putting them on his trees; but we could not get men enough to go around the orchards, and the owner believed that he had been so successful in spraying in previous years that he could do without the bandaging.

Mr. Jarvis: If there were 300 worms under one bandage in two weeks' time, it should pay to bandage. I found here at the College that bandaging was of very great benefit.

Dr. Fletcher: We have come to the conclusion that spraying is a good practice because we get clean orchards. But where there is a second brood, that must be supplemented by bandaging the trees. Mr. Fisher's experience that pigs and sheep, particularly pigs, destroy the infested apples and thus do a great deal of good in orchards is important. The time to spray will vary in different localities, and it will also vary with the different varieties of apples, as different varieties flower at different times. Mr. Fisher's experience is that it should be done as soon after the time of full bloom as possible. I find no advantage in that, and there is certainly a great disadvantage in spraying during bloom to those who keep bees, for direct experiments have shown that bees have been poisoned by sucking nectar from the flowers or drinking liquid from trees that were sprayed. Therefore, I for one think that the Ontario law is very well framed as it is, and that it should be made a misdemeanor to spray trees while in blossom: because bees are now an important part of the agriculture of Canada and particularly they are very useful to the fruit-growers in effecting the fertilization of blossoms. The time when to spray is after the blossoms have fallen, and then it must be done well. Cover the whole tree with spray and use a proper nozzle: the nozzle is as important as the material and the pump. To get a very fine spray it is desirable to find out the very best implement. We have in Canada an excellent pump, the Spramotor, with the movable discs, invented by Mr. Fisher, which is the best form of spray nozzle I have ever used. It enables one to use a very small quantity of liquid, for what is required in spraying is to have the liquid so fine that it falls on the trees as a mist or as a fine spray, and as soon as the spray begins to drip it is time to remove nozzle to another part in order to save material and injury to the trees. Arsenate of lead is highly recommended and its advantages are that it is in a finer state of division than Paris Green,

but the application must be three times as strong as Paris Green to get the same results; it also remains longer on the foliage because it does not wash off so easily. Being finer, it will remain in suspension better, and therefore arsenate of lead is, except for the matter of color, rather better than Paris Green. The danger is that in color it resembles other substances in domestic use, and therefore he did not like to recommend it for general use. It is very effective, and the mixture, if of proper strength, is safe in the hands of careful men, but it must be used carefully. It has been placed on the market in a convenient form under the names of Bowker's Disparene and Swift's Arsenate of Lead. It is a very powerful poison and very effective, but on account of the danger I have referred to, I do not recommend it except with the above named provisoes.

Dr. Bethune: I have employed the bandaging system a little and found it very effective indeed in catching the insects. The one great difficulty about bandaging is that it must be properly attended to. If you do not look after the bandages regularly, and at sufficiently short intervals, you are simply providing a most convenient place for the worm to conceal itself in and to change to the chrysalis stage. If the bandages are taken off at least every ten days and the larvae and chrysalids removed from the tree, it is a most effective and useful remedy, and is probably the only really good remedy that we have against the second brood of the codling-worm, with the exception of Mr. Fisher's plan of allowing sheep or pigs to devour the fallen fruit. Where a man has only a few fruit trees, he certainly ought to do that work himself and gather all that falls and destroy it. It is no use to gather a week after it has fallen. The drawback is that of labor and expense. I find that to examine properly a single bandage it takes at least ten minutes, because the larvae hide themselves under bits of loose bark and conceal themselves very thoroughly, and it requires a very good eye to find where the creatures are, so that it all takes time and care. No doubt that labor might be saved to some extent by having some convenient form of scraper which would scrape them off and save this troublesome work. You will, however, find under the bandages a considerable number of the worms they have not had time to conceal themselves, and these you can easily get rid of.

The question of parasites was brought before the Minister of Agriculture for Ontario in consequence of a paragraph in some of the newspapers in which he was credited with having discovered, or having available, a parasite to wipe out the codling-worm. He wrote to me on the subject and asked for information, as he was credited with a great deal more responsibility than he has any desire to have placed upon his shoulders. I told him that it was hardly possible to hope for an effective parasite, because the creature during the greater part of its life was inside the fruit and out of the reach of parasites. The only time for the parasite to attack the insect is during the very short period between the emergence from the egg and the time it is buried away inside the fruit, and then again it might be attacked after it has left the fruit and is proceeding to crawl to some convenient place before changing into a chrysalis. However, at his suggestion, I have been making inquiries both in California and at Washington and expect very soon to have some fuller information.

One other point which has been referred to I should like to emphasize, and that is the usefulness of birds in destroying these insects. A very large number of the larvae are destroyed in the winter time by woodpeckers, creepers and nuthatches. These birds ought to be encouraged in every way. Good work is also done by the chickadees and other birds. The

chickadees may be kept around an orchard or garden by helping them out with a little food during the winter. A good plan is to hang some suet in the trees.

The remedies then for the codling-worm are, first, spraying to get rid of the first brood, which can be exterminated, or nearly so. Spraying at the proper time and in the proper manner, as has been described this afternoon, should be resorted to, and also the removal of all fallen fruit. For the second brood, there is the bandaging. Then, after that come the woodpeckers and other birds. We cannot trust much to parasites, but we may be quite sure that our enterprising Minister of Agriculture will use every effort to bring the parasites, if they are found to be effective, into this country and make use of them here.

Dr. Fletcher said that parasites are not useless by any means. There are internal parasites as well as external parasites, and some of these parasites would be able to reach the worm in the apple. The larvae of the large Pigeon Tremex, which bores deep in the solid wood of maples, is parasitized by the two large Thalessas. There are several parasites which are also able to find out their hosts in the wood of trees. We do not know everything yet about parasites, but we must not say that they will not do this work. There are several parasites of the Codling-worm, as Dr. Brodie has told us, and when we find parasites in large numbers we may expect to obtain some results. To give an instance—one of the striking outbreaks at Ottawa was an aphis on birch trees, which was so abundant that the whole of the tree was covered with a black fungus, growing on the honey dew exuded by the aphis. The insect was abundant in June and July. Then we found that all over these trees affected by the plant aphis there were myriads of lady-bird beetles, and these beetles were so numerous that they wiped out the whole lot of aphis. We found ten to twenty of their pupae on a single birch leaf. What became of all those lady-bird beetles? Perhaps from a branch holding, say 50 leaves, we did not get 50 lady-bird beetles, but got a great many thousands of another parasite, forty to fifty of a little hypoparasite from a single pupa. Thus nature brings back again the balance by reducing the excessive number of beetles. Where one pupa produced a beetle, forty-nine never produced beetles but produced parasites. We do not know yet what can be effected by a Codling-worm parasite, but we must not give it up as hopeless. It is most hopeful. As Dr. Bethune showed us, though, we must not be too sanguine. With regard to the worms that burrow in the bark beneath the bandages, I find a brush with wire for bristles a convenient instrument for removing them. One was supplied with my furnace and I have made use of it to scrape off the worms on apple trees. Time can be saved with a proper implement, and a wire brush of this kind is good. The codling-worm does not change to a pupa inside its cocoon at once, but remains as a larva until just before it is going to emerge.

Mr. Scott: How do you kill the cocoons in the burlap bandages themselves?

Dr. Fletcher: It is rather a troublesome matter. One man who bandages his trees has at the side of his orchard an India rubber wringing machine and runs them through that, or they may be thrown into scalding water. The burlaps are all taken off into a wheelbarrow and dropped into large open caldron used for sugarmaking; they are taken out at once and put back again. These are the only two methods known to me.

Mr. Nash: I saw a man screw the wringer on the side of the wheelbarrow, and go through the orchard with it.

Dr. Fletcher: Hot water is probably the most effective method of killing the worms.

Mr. Jarvis: Those left on the bandage and pressed, if very numerous, might spoil the bandage.

The hour for closing the discussion on the Codling-worm having arrived, the Chairman thanked those who had taken part in the discussion and called for the reports of the Directors of the respective districts.

REPORTS ON INSECTS OF THE YEAR.

Division No. 1.—Ottawa District. By C. H. Young, Hurdman's Bridge.

The season of 1906 in the Ottawa District was marked by cold, wet weather in the early part and later by an excessive drought. The most noticeable insect feature of the season was the enormous numbers of plant lice which infested every plant. Trees were much reduced in vitality and many complaints were made of the leaves falling prematurely. In going through the woods in July it was almost impossible to collect a good botanical specimen, as the foliage of all low-growing plants was covered conspicuously with the honey-dew emitted by the aphides. The elm-leaf aphis and the maple leaf cottony aphis were particularly abundant. The foliage of many fine maples was noticeably disfigured by this latter insect. Birches also suffered very much from aphis. Some fields of potatoes were badly infested with a plant louse which Dr. Fletcher tells me he thinks is *Nectarophora solanifolia*.

In the early part of the season the usual occurrence of cutworms in gardens was noticed, the species doing the most harm being the Red-backed cutworm (*Paragrotis ochrogaster*) and the Black army-worm *Noctua fennica*. This latter cutworm works particularly in clover fields, but in the Ottawa district clover was winter killed during the open cold winter of 1905-6, and this fact probably accounts for their presence in vegetable gardens this year. Where applied, the poisoned bran mash soon stopped the ravages of these cutworms.

At the time dahlias and asters were coming nicely into flower, the Tarnished Plant-bug was very numerous and did a great deal of damage in destroying the flowers and forming buds. This is a difficult pest to treat. Spraying the plants with kerosene emlusion or whale oil soap or dusting them with pyrethrum insect powder, have given relief, but these remedies are not always satisfactory. In the early morning, when the bugs are not so active, many may be collected by beating them off the plants into an inverted umbrella, and then killing them by putting them into some receptacle containing water and coal oil.

The small white cabbage butterfly was not particularly in evidence in the early part of the season, but the late brood in September was very abundant and hundreds of the butterflies could be observed in some cabbage patches. Where these patches were neglected the green caterpillars soon did noticeable damage.

The Turnip Flea beetle was locally very destructive on a few farms near Ottawa. Some farmers who did not know the well-known remedy of Paris green and land plaster lost two or three sowings.

In asparagus beds, where the plants had been allowed to go to seed, many specimens of the Zebra caterpillar (Fig. 1) were noticed in September and early in October feeding on the leaves. This of course was due to the fine, almost summer weather which we have had this fall in Ottawa.

Among orchard insects the caterpillars of the Codling moth were abundant in orchards which were not sprayed, and later in the season the conspicuous nests of the Fall-Web worm were noticed in many orchards. This latter insect was also very bad in forests, ash, elm and other trees being much defoliated. In orchards these insects are not only destructive, but make the trees very unsightly. The remedy of cutting off the branches bearing the nests when these are small is such an easy one that I cannot understand why owners of good orchards allow this insect to work on their trees. A few colonies of the Red-humped apple tree caterpillar (Fig. 2) and the yellow-necked apple tree caterpillar were observed, but of course these did not do much harm. Cedars everywhere were much disfigured by the small caterpillars of *Argyresthia Thujiella*, a beautiful little white moth with bronzy bars on the wings. These minute larvæ feed on the tips of the shoots, causing them to die and lose their natural color.

I am glad to inform the members of our Society that I have been able to continue my collection of lepidoptera, most of my time being spent in working up our small forms, the micros. The specimens which I have brought with me will, I think, delight some of you. For these small moths the season has been very good at Meach's Lake, where I spent the summer, but speaking generally, I do not think the season was as good as 1905, at least in the Meach's Lake district.

Fig. 1.—(*a*) The Zebra Caterpillar.
(*b*) The Moth (Mamestra picta).

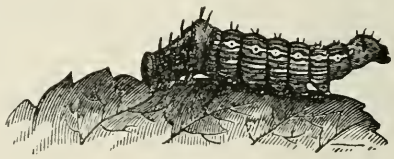

Fig. 2.—The Red-humped Apple Tree Caterpillar (Notodonta concinna).

Division No. 2.—Midland District. By C. E. Grant, Orillia.

Though I have been very busy with town work this year, which has prevented me from doing a great deal with the net, I have observed that most insects have been unusually common; at the same time the rapid growth of vegetation has apparently reduced the destructiveness of some species. The chief complaint made to me in this neighborhood has been with regard to the Buffalo beetle, which has become quite a nuisance here. Dr. Fletcher was kind enough to send to the *Packet* newspaper of Orillia the best methods

of prevention; at the same time there does not seem to be any permanent remedy if you do not close your houses up in the spring time. The cutworms were very abundant and our old stand-bys, the codling moth and onion maggot were, as usual, destructive. The currant sawfly was also abundant this year, though for two years previously I left some bushes unsprayed and they were not at all eaten. Tent caterpillars were not numerous in the spring, but the Fall Webworm was to be seen nearly everywhere in September. The Tussock moths, though common as moths, do not do much harm as far as noticed here. There has been no complaint of the Pea weevil, though I have asked several intelligent farmers of the neighborhood to inform me of their ravages if noticed. Altogether I might say that this district has not been troubled with any serious outbreak of insect pests. Though the season has been an exceptionally fine and warm one, as I said before, I have not been able to give much time to entomology this year, but I have added one more Plusia, also *Harrisimemna trisignata* and *Arsilonche albovenosa* to my collection of local moths. I also have to report the second capture of *Junonia cœnia* in Orillia.

Division No. 3.—Toronto District. By J. B. Williams, Toronto.

The Tussock moth, as usual, did a good deal of damage to the shade trees in Toronto. About the middle of July the caterpillars began to let themselves down from the trees by a thread to the ground, and then ascended the trunks to pupate. Many of them were very small, and had a sickly yellowish look, and made poor little cocoons. Such specimens, I imagine, had been suffering from parasites, and on some trees the proportion of these small cocoons that seemed to come to nothing was very large. I saw a cluster of eggs on August 5th, but there do not seem to me to be as many eggs as usual on the infested trees.

The row of chestnut trees from which I had the cocoons collected last year, had some caterpillars on this year, but they were not nearly so numerous as on some neighboring trees, so that the destruction of the egg masses last year evidently did some good.

Apple trees around Toronto have been a good deal damaged by the Codling moth. In two orchards that I examined, one in the city and one about a mile outside, a very large proportion of the apples had been rendered quite worthless by the ravages of this pest.

I visited Niagara Glen in September, and found the Walking stick insects almost as numerous there as they were two years ago. Several large basswood trees had been completely stripped of their foliage by these creatures, and I noticed a Chestnut oak (*Quercus prinus*) some ten or twelve feet in height, with about two-thirds of its foliage destroyed, but the swarms of Stick insects that were upon it must, in a few days longer, have cleared off every leaf.

Division No. 4.—Hamilton District. By George E. Fisher, Burlington.

In making my report of insect conditions in the Niagara District, which as a Director of the Entomological Society of Ontario I am supposed to represent, I can speak advisedly of my own immediate section and of such particulars as came to my notice during occasional visits to other parts of the district.

The phenomenal increase of the San Jose scale and of the Fall Web-worm and the attack of the Codling worm upon the apple crop, which was unprecedented in severity, were the most conspicuous features of the year.

The Curculio, aphis, potato beetle, asparagus beetle, cabbage worm and a host of others were everywhere present and ready to take advantage of any grower's neglect. Wireworms are making considerable trouble in garden land, and the Spruce Gall-louse is continually cropping up and is now known to be widely distributed. Tent caterpillars and Canker worms were not plentiful.

As our growers understand it, the Wireworms require three or more years to complete their life circle, and are in the pupa stage during the months of August and September, when they are easily destroyed by deep and frequent plowings and cultivation, but unfortunately the gardeners' land at this season is so fully occupied with growing crops as to render such treatment impracticable, and the pest continues.

Opinions differ as to the behaviour of the Spruce Gall-louse and the people are looking to the entomologists to determine its life history and habits definitely and to suggest a remedy. In the meantime they are picking off the galls, spraying and fumigating, thus holding it in check where this was done.

The Asparagus beetle has increased surprisingly. Small beds may be protected by the hen-and-chick method, but in large plantations involving several acres this is scarcely possible. There are instances of the young growth being covered with beetles before reaching marketable size, which disfigure both by gouging into it and by depositing their black eggs in large numbers. In this condition it is valueless.

Asparagus rust is also very troublesome. The only convenient remedy we know of for large blocks is careful and persistent spraying of the growth, after cutting is discontinued, with Bordeaux mixture heavily charged with arsenic, which will reduce both rust and insects. Some of our people have signified their intention to give up the struggle, which is to be regretted, as asparagus is generally appreciated, and under ordinary conditions is a source of considerable revenue to the growers.

Copper sulphate is being much used on potatoes in the form of Bordeaux mixture with arsenic, being first applied immediately after the first hoeing and at regular intervals until about five treatments are given. In this way blight is lessened, the vines retain their leaves, the crop is increased, the quality improved, and the bugs do not at any time become plentiful, for when larvæ are young they eat much more ravenously than they do later on and with less discrimination.

Notwithstanding the pains it takes to advertise its presence, the increase of the Fall Web-worm is very marked indeed, which can be attributed only to careless neglect on the part of the growers.

Grape-rot was prevalent in many sections and the free use of Bordeaux was found to be very effective in controlling it. Four or five treatments are necessary, the first treatment being given before the buds open. Where this early spraying was omitted the rot was much more general, especially on the red and white varieties, which in many instances when not sprayed early showed a waste of from twenty to fifty per cent.

There is no insect so widely distributed and so destructive to the fruit crop of the country as the Codling moth, which causes the loss of many thousands of dollars annually. This was pre-eminently a Codling moth year, the worst on record. In many apple orchards one-half of the crop was wormy,

and in some the proportion of injury was even greater. How to lessen the ravages of the Codling worm is an intricate problem for apple and pear growers who resort to various means. The most popular remedies are spraying with arsenic, bandaging, and keeping hogs and sheep in the orchard. Spraying, to be effective, must be done while the calyx remains open and before the fruit turns down, which will be useful only in reducing the first brood. Bandages should be applied early in June after the rough bark has been scraped from the trunk and large limbs. Being thus deprived of the natural shelter, the larvæ will continue their pilgrimage until they ultimately come to the snug quarters which the bandage affords, where they will remain. If these bandages be removed, and, after the worms have been destroyed, be returned to the tree at intervals of ten days and this be continued throughout the season and until after the crop is harvested, the evil will be materially lessened Notwithstanding the great advantage which is sure to follow, these methods require more time and labor than the average farmer is likely to expend under existing labor conditions. In the Niagara district there are a good many successful apple and pear orchards standing in sod, and the owners unhesitatingly declare in favor of this treatment. Some cultivated formerly, but have abandoned cultivation. Others have part of their orchards in sod and part in cultivation, and say the trees in sod give the best results. They all agree that the grass must be kept pastured off very closely and never be allowed to get much top.

Hogs and sheep are usually kept in these orchards. The advocates of this method claim that their trees bear more regularly, that the fruit is more highly colored, and keeps better than that from cultivated trees, and that they keep the proportion of wormy apples well below ten per cent. I have observed that pruning has been carefully attended to in all successful orchards standing in sod.

I do not wish just yet to be understood as advocating sod in orchards, but have no hesitation in endorsing all of the advantage that is claimed to attend the presence of sheep and hogs. And further, this treatment is easy and much more likely to be conducted to a successful conclusion than either of the methods first mentioned.

Since its introduction into Canada never before did the San Jose scale enjoy conditions so favorable for its increase as were experienced during the past twelve months. The exceptionally mild winter suffered a much larger proportion than is usual to come through alive, and the hot, dry summer furnished ideal weather for rapid multiplication. It is needless to say that the scale made the best possible use of its opportunity and that the increase and spread were much greater than was ever before observed in this country.

This remarkable increase and the effect upon the trees were so easily seen that many growers question the possibility of combatting the scale successfully, and are taking no action. At the same time a few others, who have counted the cost carefully, and considered the advantage of both saving their orchards, and disposing of full crops on bare markets, have used lime and sulphur thoroughly cooked and freely applied for four or five years, with exceedingly gratifying results. These men did not shrink from the necessary expenditure, and besides maintaining their orchards in the highest possible condition of health and vigor, have realized greater net profits from them than they ever did before the advent of the San Jose scale, and this, too, in the midst of infested surroundings.

EVENING SESSION.

Wednesday, October 10th, 1906.

A public meeting was held in the Massey Hall of the Ontario Agricultural College at 8 o'clock, p.m. Notwithstanding the inclemency of the weather, the first snowstorm of the season prevailing at the time, the large hall was nearly filled with an appreciative audience, including many of the students from the College and Macdonald Institute and some visitors from the city of Guelph. The chair was taken by Dr. Fletcher, the Vice-President, who opened the proceedings by congratulating the Society upon its successful removal from London to Guelph, and on the excellent arrangements that have been made for its library and collections by the authorities of the Ontario Agricultural College. He believed that the Society would fully appreciate its new home and find its usefulness was very greatly extended by its being placed in the midst of an enthusiastic band of young men and women students. When these completed their courses of instruction they would scatter all over the country, and carry with them much they had learned through the instrumentality of the Society; many of them, too, would become active members here and continue their connection after they had left He looked forward with confidence to the bright days in store for the Society in which it would fulfil the duties that devolved upon it in a larger measure than ever before.

President Creelman gave a warm and hearty welcome to the Society and expressed the pleasure that he and all connected with the College felt in having its headquarters in their midst. Last year he was proud of the meeting, which was held here at the College, and wished that we might have it every year; now he was glad to say that this had come to pass and that these annual meetings would, as a rule, be always held here. This Ontario Entomological Society is a great Society, not so much in numbers as in the value of the work that it has accomplished, and which it continues to perform. He then spoke of the two systems of education and pointed out the advantages to be obtained from a combination of a knowledge of natural history with a good general education; this he considered much superior to the old-fashioned methods in which the pupil grew up without any knowledge of the common objects in the world about him. The practical value of Entomology to farmers and fruit-growers he did not think could be over-estimated; if put into figures, it would mean nothing below millions of dollars. He was especially gratified that the chairman had described their new quarters as "home," and trusted that it would continue to be their home for many a year to come. He then placed at their disposal everything that the College could offer for their comfort and convenience, and trusted that the meeting would be both profitable and enjoyable.

The chairman then called upon Mr. John D. Evans, of Trenton, the President of the Entomological Society, to read his address. This was followed by a paper by Prof. Lochhead, of Macdonald College, Ste. Anne de Bellevue, P.Q., on "What the Entomological Society of Ontario can do for the Ontario Agricultural College." In the absence of the writer, who was unavoidably prevented from being present, the paper was read by Prof. McCready. Mr. Paul Hahn, of Toronto, then gave a description of a canoe trip for entomological purposes in the Algonquin Park, and illustrated his remarks with a number of beautiful and interesting lantern slides made from his original photographs. A hearty vote of thanks was given to Mr. Hahn for his entertaining address. The proceedings of the evening were much enlivened by musical selections, both vocal and instrumental, furnished by the College Philharmonic Society.

ANNUAL ADDRESS OF THE PRESIDENT.

By John D. Evans, C.E., Trenton.

When at the annual meeting of a year ago I referred in my address to its being the first meeting held at the fountain-head of Economic Entomology for the Province, little did we surmise that this noble Institution, the Ontario Agricultural College, would so soon become the headquarters of the Society.

We extended a hearty welcome on that occasion to Prof. Franklin Sherman on his accession to the duties of Entomologist, etc., on the staff of the Ontario Agricultural College on the retirement of his most worthy predecessor, Prof. Wm. Lochhead, but we little thought that his time with us would be so brief; but no doubt he was sadly missed in his old haunts, and rejoicings were much in evidence when he returned to his former position.

During his, Prof. Sherman's, short term of office he infused fresh blood into matters entomological and laid the foundation for a more complete and thorough system of collecting and maintaining a collection at the College of the Insect fauna of Ontario.

Upon the retirement of Prof. Sherman, who could be found as his successor more worthy or capable of undertaking the duties of Entomologist for the college than our most highly esteemed Editor, Librarian and Curator, Rev. Dr. C. J. S. Bethune, one of, if not the father, of Entomology in Ontario. When this matter was settled it became a most serious consideration for the welfare of this society into whose hands could be placed the care of the Library and collections. No one resident in London could be found who had the leisure and knowledge necessary for the proper performance of the duties inherent to the circumstnaces. It was suggested that a transfer of the Society's library and collections be made to Guelph, where accomodations for the same and the business of the Society would be provided by O. A. College authorities, rent free, and no change be necesasry in the office of Librarian and Curator.

Some of the local (London) members of Council were adverse to the proposed change, suggesting that the transfer should be made to the Normal School in London, but others of the members being otherwise minded it was proposed to take a vote of all the members of the Council. Towards this end a circular letter was issued on the 4th day of May and ultimately replies were received from all the members when the vote stood *eleven* for the removal to Guelph and *four* against it; one member declining to vote, but suggested to lay the matter over until the Annual Meeting.

As the matter stood nearly three to one in favor of the removal, the undertaking was carried out during the month of August last without accident or mishap of any kind, and the Library and collections are now installed in their new, commodious and most desirable quarters, where they will be of inestimable value, not only to the students attending the college from year to year, but to all investigators of Economic Entomology, the College being the head centre, as it were, of that department in the Province, and where they will naturally congregate and look for assistance and inspiration.

Under the present conditions the usefulness of the Society will no doubt be greatly extended. It is hoped for and trusted that the number of members will be greatly increased through the instrumentality of the precincts of the

O. A. College, and a goodly number of the names added from year to year will continue on as active members long after they have severed their close connection with the College and drifted off to the four quarters of the globe.

An agreement has been entered into by and between the O. A. College and the Entomological Society of Ontario whereby the College provides ample accommodation for the Society's Library, Collections and business requirements, free of rent and completely under its own control in every respect, and subject to the withdrawal of the same by the Society at any time they may be disposed to do so.

This present occasion is the Forty-Third Annual Meeting of the Society. During all these long years this occurrence has come around regularly and without a break.

It was in 1863 (quoting from Rev. Dr. Bethune's "Rise and Progress of Entomology in Canada," printed in the Transactions of the Royal Society of Canada and read May 26th, 1898,) that the Society had its inception at a meeting held in Toronto at the residence of Prof. Croft.

In 1872 the headquarters were moved to London, Ont., where it has remained up to the present year. It is with feelings of great regret that we have to renounce old associations of such long standing, but a change was imperatively necessary.. It is hoped and expected that the move recently made will give a fresh impetus to the good works performed by the Society in the past and that it will now enter upon a new lease of life with its range of possibilities greatly augmented.

The quantity of new literature issued during the past year has been quite up to the standard. Not only the usual number of periodicals, magazines and reports of State, Federal and Provincial authorities have been regularly issued, but reference might be made to several new books, notably a new work on "Entomology," with special reference to its Biological and Economic aspects, by Dr. Justus Watson Folsom, in which are numerous illustrations, many of them being entirely new and of a high grade.

Also "A Glossary of terms used in Entomology," by Dr. John B. Smith, a much needed work which will prove of great service to very many entomologists.

We must all deplore the great destruction of property and loss of life occasioned by the appalling earthquake and fire in San Francisco in the early part of the year and express our heart-felt sympathy with the rescued and sufferers. This, no doubt, has been the occasion of the most extensive and irreparable loss the world has ever known of both private and public collections of Insects and of Libraries relating to the same.

The season of 1906 has been an unusual one. The winter was extremely mild, especially the months of January and February, with a very light snow fall. This was followed by a very dry, cold backward spring and a very wet June; July, August and September being noted for the excessively hot and unusually dry weather.

Insect depredations, so far as I have been able to ascertain, have been but slight or of little consequence. The pea-weevil has not given any trouble. Numerous instances of the nests of the Fall-web worm, *Hyphantria cunea*, Dru., have been observed on apple, elm and other trees, but no serious injury done.

In the vicinity of Frankford a number of cases occurred where isolated oak trees had been completely defoliated, caused probably by the Forest Caterpillar, *Malacosoma disstria*, Hub. Attempts were made to procure some of the insects, but too late; it was reported that they had died in large numbers, but from what cause could not be ascertained.

For some years past in several portions of the United States, notably New York State and New Jersey, also in Cuba, a war of extermination has been declared against the Mosquitoes by draining marshes and pools and also by covering stagnant water with a thin coating of petroleum, but now the fight is being carried to our own shores, for quite recently Mr. Henry. C. Weeks, Secretary of the American Society for the Extermination of the Mosquito, has been invited to Toronto to discuss and advise with those interested as to the best means of combatting the evil on Toronto Island.

WHAT THE ONTARIO ENTOMOLOGICAL SOCIETY CAN DO FOR THE ONTARIO AGRICULTURAL COLLEGE.

By William Lochhead, Macdonald College, Ste. Anne de Bellevue, P.Q.

The removal of the headquarters of the Ontario Entomological Society to the Ontario Agricultural College is now an accomplished fact; and whether it was a wise move or not remains to be proven by the accomplishment of better work. I must, however, congratulate the O. A. C. on the new relationship, for I see many advantages that will come by the transfer to the College, and especially to the Entomological Department.

First of all, the Entomological Society of Ontario has won a reputation that is almost world wide; it is well and favorably known wherever insect life is studied. Its publications are valued by every Entomological investigator of note, and the best workers of North America contribute regularly to the pages of the *Canadian Entomologist*. For 43 years our Society has been in active existence, and the influence it has exerted during all these years on the progress of Entomology and education along Nature-Study lines in Canada has been very great and can scarcely be estimated.

For 43 years Dr. Bethune has stuck to the ship, and under his careful guidance the shoals and rocks and bars have been successfully passed. All honor to the men who have been associated with him for many years, viz., Dr. Saunders, Dr. Fletcher, Dr. Fyles, Mr. Lyman, Mr. Harrington and our President, Mr. Evans, for their most valuable and voluntary assistance. For 43 years the Ontario Entomological Society by means of its annual reports and special popular lectures has been educating the rank and file of the people into a knowledge of insect life.

I believe, therefore, that the transfer to the O. A. C. of the headquarters of a Society such as ours, which has done so much for Entomology the world over, will give an impetus to the study of insects at the College, and the Entomological Department at the O. A. C. will become better known on account of its intimate connection with the Entomological Society.

Again, the Ontario Entomological Society has all along been known as a great educational agency. It has taken the lead in educating the public as to the life histories of the injurious insects and the best means of controlling these insects. It has also done much to foster the Nature-Study Movement which means so much for the children. With its home at the centre of the agricultural education of the Province the Entomological Society and Entomological Department will be able to co-operate more effectively than was possible in the past. I look for a great forward movement in educational lines under the new arrangement.

Under the new partnership the Ontario Agricultural College can furnish the facilities and means of doing work, viz., its laboratories, insectary and funds for travelling. The Entomological Society can furnish the men and influence. The members of the Society scattered through the Province can be brought more closely into touch with the work of the Society and the Department. Their energies can be directed to better advantage by the central agency, Dr. Bethune and his assistants; and the season's observations will, therefore, be more definite and hence more valuable.

As you all know, the Ontario Department of Agriculture publishes and distributes for the Society its annual report which contains the papers prepared by its members. This report is edited by Dr. Bethune, and is printed early in the New Year, so that the recommendations made by the members may be of service to the fruit-grower and farmer the following year. Moreover, the records and observations which are often of great value, are distributed promptly to brother observers all over the world. Now the Entomological Department, with its head as Editor of the Annual Report, is happily situated in that it can place on record before the scientific world its observations of the year.

What an incentive to ambitious students to make careful observations during the summer holidays on their farms! No other Department at the College has such facilities at its disposal for the immediate publication of scattered records and observations which could not well be published in bulletin form.

Again, the Entomological Society brings to Guelph its large collections of insects which have been carefully looked after for many years. The specimens in the collection are valuable in that they represent Canadian forms mainly, and many are types of new species described in the *Canadian Entomologist*. The specimens have been carefully named by specialists, and are thus simply invaluable for purposes of reference. These collections now become, therefore, part of the collection of the Entomological Department and are at the service of that Department for research and lecture work. Advanced students and specialists in systematic Entomology will soon appreciate the worth of such collections when they undertake the study of special groups of insects. For many years the College had but a meagre reference collection, which condition of affairs rendered the work of instruction extremely arduous and time-consuming. Students outside of the College will no doubt be encouraged to send in specimens for identification and for help; and every outsider helped increases the reach and influence of the College.

Again, the Entomological Society's library, which also comes to the O. A. C., is one of the best specialists' libraries in Canada, or the United States for that matter. It contains an unusual large number of full sets of entomological journals obtained mainly by exchange with the *Canadian Entomologist* during the 37 years of its publication. Besides these, the library contains nearly all the Entomological publications—in English, at any rate—of the last 40 years.

For research and advanced work all the books and journals are at the disposal of the students and staff. Without them the staff was formerly much handicapped for lack of literature dealing with special groups of insects.

Connected as I was with the Entomological department of the O. A. C. for many years, and having labored hard under difficulties that are now largely removed by the transfer of the headquarters of the Entomological Society to the Entomological department of the O. A. C., I feel envious

of Dr. Bethune and Mr. Jarvis, especially when I see the opportunities for work that they now have. When I take a backward look over my own early work here and contrast the meagre facilities I had at my disposal, with the splendid equipment of books, collections, laboratories and insectary that are now at the disposal of the Entomological department, I am constrained to exclaim, "How the times have changed!" But while I envy Dr. Bethune, I must congratulate him and the College on the present happy state of things, and may he live long to enjoy the work that he has so much at heart! May the Agricultural Department and President Creelman continue their generous treatment of a Department that is now in such an excellent position to do much for the Province!

SECOND DAY'S SESSION.

Thursday, October 11th, 1906.

The Vice-President, Dr. Fletcher, took the chair at 10 o'clock in the Biological lecture room of the Ontario Agricultural College. There were present throughout the day a large number of students from both the College and the Macdonald Institute, in addition to the members of the Society. The first order of business was the reading of the reports of the Council, the Branches of the Society at Montreal, Quebec, Toronto, Guelph and British Columbia, and of the Treasurer, Librarian and Curator, and the Delegate to the Royal Society. This was followed by a debate on the San José Scale.

SAN JOSE SCALE.

Mr. J. Fred Smith, San José Scale Inspector for the Province of Ontario, was commissioned by the Department of Agriculture to bring before this meeting of the Society the prevalence of the scale on fruit exposed for sale in Toronto and elsewhere, and the question whether this might prove to be a menace to sections of the country where the scale did not already exist. In his opinion the danger is not very great, as the fruit, when consumed, is peeled and the rinds which bear the scales are thrown into the domestic receptacles for garbage, and thus the scales are destroyed without any opportunity of spreading to trees. The larvae cannot live long without food and when the rind is removed from fruit, it quickly dries up and the supply of liquid food for the insect no longer exists. He thought, however, that if the sale of scale-infested fruit was forbidden, it would compel the growers to take more trouble to keep their trees free from it. He considered that the scale was not spreading much, but where it did occur it was becoming a very serious danger to the orchards. In small centres of infestation it could be exterminated, and those interested should use every means in their power to get rid of it. It had recently spread to Font Hill and would no doubt spread further about the different centres if not properly dealt with. He exhibited a number of specimens of apples and pears more or less encrusted with the scale.

Mr. T. D. Jarvis said that he had found the scale on trees in private grounds in Toronto, and was of the opinion that the scale must have been introduced on fruit. At the time of the Exhibition three years ago he found

that 75 per cent. of the fruit brought into Toronto that came under his observation was affected with scale. The consumers of the fruit throw out the peelings and the insects may thus be enabled to reach near-by trees, especially through the agency of sparrows and other birds. He noticed that the apples sold by Italians in the streets of Toronto were badly covered with scales.

Dr. FLETCHER contended that there was no danger of an introduction of the insect by means of scaly fruit, as the peel to which it is attached would soon lose its moisture and the insect would die from want of food. To be successful, the skin of the fruit must remain moist enough to sustain the life of the insect; the female must be ready to produce her young; and the young must be able to reach a fruit tree—a combination of difficulties which it would be hard to overcome and which rendered infestation by this means extremely improbable, if not impossible. He did not think that many people would buy scaly fruit, and a grower would not venture to sell it, if he valued his reputation. He considered that it would be unjust and wrong to legislate against the sale of scaly fruit and thus injure a vast and most important industry.

Mr. CAESAR stated that the scales were sometimes carried by ants, and as ants were often attracted to fruit peelings, they might easily be the means of transporting them to trees. Scales were sometimes attached to lady-bird beetles also.

Dr. FLETCHER said that in Germany and in the United States there had been legislative enactments forbidding the sale of any fruit infested with scales, and much inconvenience and loss had been inflicted without any compensating advantage. He considered that it would be wrong to legislate against the sale of such fruit until we are quite sure that such restrictions are necessary to prevent the spread of the insect. We must not be alarmists and magnify the danger; the infested localities in Ontario are few and small, and the spread of the scale is not by any means rapid.

After some further discussion, in which others took part, the opinion of the meeting at the close of the debate was unanimous that it would not do at the present time to make any stringent regulations forbidding the sale of scale-infested fruit and thus hamper a very important industry. As there is so much doubt and difference of opinion regarding the danger from it, and our information is so limited, it would be unwise to frame any regulations till we are quite sure of the dangers to be guarded against. It was thought highly advisable that an inspection should be made of infested trees in Toronto and the origin of the scale upon them traced as far as possible. Young trees might have come from infested nurseries, but old trees, if attacked, must have received the insect in some other way.

The rest of the morning was occupied with the reading of a paper by Mr. Lyman on "A Search for a Borer," and an address on Gall Insects by Mr. Jarvis. The latter was illustrated by a large number of original lantern pictures and a profusion of specimens of a great variety of galls.

In the afternoon the remainder of the papers on the programme were read; they will be found in subsequent pages of this report. The election of officers for the ensuing year, 1906-7, was proceeded with and resulted as shewn on page 2.

The following exhibits of specimens were made by members during the meetings and attracted much attention:

By Mr. J. D. Evans.—A series of *Eucosma Scudderiana*, with parasites and super-parasites; some interesting Noctuids, and a species of Saw-fly which had been found injuring Virginia Creepers.

By Dr. James Fletcher.—Some remarkable forms of *Colias philodice* taken at Digby, Nova Scotia, by Mr. J. Russell, together with *C. interior*, *Grapta satyrus-marsyas*, *Thecla irus* and *T. lœta*, also taken at Digby by Mr. Russell. A pair of *Cœnonympha kodiak* and *Erebia Magdalena* taken in the Yukon by Mr. Jos. Keele of Ottawa. Specimens of two species of wasps, *Vespa borcalis* and *V. diabolica* which were reared at Ottawa from the same nest on three separate occasions. An interesting photograph of the webs made by the larvæ of *Ellopia somniaria* at Victoria, B. C., sent by Mr. E. A. Carew-Gibson.

By Mr. Arthur Gibson.—Living larvæ of *Cicindela repanda* and specimens of the Bean-weevil, *Bruchus obtectus*. Also some specimens of rare caterpillars inflated and larvæ of *Œdemasia concinna* parasitized by *Limnaria Guignardi*, which has been very abundant this year.

By Mr. Paul Hahn.—Two cases of Lepidoptera taken in the Algonquin Park, Ontario, and a fine specimen of the tropical moth, *Thysania zenobia*, captured at Toronto.

By Mr. C. W. Nash.—Some specimens of Lepidoptera, including the Burdock-borer, *Papaipema cataphracta*.

By Mr. H. H. Lyman.—Two interesting cases of Lepidoptera, including some rare forms of micros, and specimens of *Gortyna appassionata*, *Grapta satyrus* and *marsyas, faunus* and *gracilis;* also a specimen of G. *satyrus* almost identical with the insect figured by Mr. W. G. Wright as *Grapta chrysoptera*, in his Butterflies of the West Coast of the United States.

By Mr. J. B. Williams.—Two living larvæ of *Ecpantheria deflorata*, which he had found feeding on violets in Niagara Glen, Ontario.

By Mr. C. H. Young.—A large case containing over a thousand specimens of Micro-lepidoptera, most exquisitely prepared for exhibition; the majority of the species included have been studied by Mr. W. D. Kearfott. Also a similar case containing many life-histories of rare Noctuids and other Lepidoptera; among them was a fine series of *Papaipema appassionata* and *P. Harrisii*, var., with larvæ; the former was reared from Pitcher-plant, and the latter from *Pteris aquilina*.

By Prof. Bethune.—The life-histories of the two asparagus beetles, *Crioceris asparagi* and *12-punctata*.

By Mr. T. D. Jarvis.—Several hundreds of examples of Galls on leaves, twigs, etc., in illustration of his paper.

By Mr. E. J. Zavitz.—A number of insects affecting Forest-trees.

At the close of the meeting a very hearty vote of thanks to President Creelman for his kindness in providing every facility for carrying on the sessions in the College buildings was unanimously adopted.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its report for the year 1905-6.

The forty-second annual meeting of the Society was held, by kind invitation of President Creelman, at the Ontario Agricultural College, Guelph, on the 18th and 19th of October, and was attended by a large number of the students as well as by many members from a distance. The Society was also favored with the presence of Professor J. B. Smith, State Entomologist of New Jersey, a distinguished entomologist and an honorary member of the Society, and of Mr. C. C. James, Deputy Minister of Agriculture for Ontario.

During the first afternoon the reports of the directors on the noteworthy insects of the year in their respective divisions were read and discussed; papers were also presented by Dr. Fyles and Mr. H. H. Lyman on the Tussock Moth; by Prof. Sherman on Entomological conditions in North Carolina, and by Prof. Lochhead on the experiments made during the year against San José scale.

In the evening a public meeting was held in the Massey Hall at the College and was largely attended. Addresses of welcome were given by President Creelman and Mr. B. Barlow, representing the Wellington Field Naturalist Club. These were followed by a very interesting account of the Mosquito work in New Jersey, illustrated with a large number of lantern slides from original photographs and drawings, by Prof. J. B. Smith. The second day was occupied with the election of officers and the reading of reports from the branches, as well as a number of papers on a variety of important entomological subjects.

The 36th Annual Report on economic and general Entomology was duly presented to the Legislature of Ontario, and was printed and distributed at the beginning of February—a much earlier date than usual. It contained 143 pages, illustrated with 74 figures in the text, and contained in addition to the papers already referred to, the following articles: "Insects as Nature Studies," by Prof. McCready; "Forest Insects" and "The advantages and disadvantages of the Canadian Entomologist," by Dr. Fyles; "Orthoptera and Odonata from Algonquin Park," by Mr. E. M. Walker; "Butterfly Collecting in Canada," by Mrs. Nicholl; "Insects Injurious to Canadian Crops in 1905," and the important "Entomological Record for 1905," by Dr. Fletcher; "Injurious Insects of the Flower Garden," by Mr. A. Gibson; "Forest Entomology," by Mr. E. J. Zavitz. "The Phlox Mite," the "Blue Spruce Saw-fly," and the "Bumble-bees that Fertilize the Red Clover," by Mr. T. D. Jarvis; "Injurious Insects of 1905 in Ontario," by Prof. Lochhead; a similar paper by Dr. Fletcher; and "Notes on the Season of 1905," by Mr. C. Stevenson.

The Canadian Entomologist, the monthly magazine of the Society, has been regularly issued. The 37th annual volume was completed in December last and ten numbers of volume 38 have now been published. The volume for 1905 consisted of 427 pages and was illustrated with seven full-page plates, one of which was coloured, and 29 figures from original drawings. The contributors numbered 62 and included writers in Canada, the United States, England, Jamaica, and the Hawaiian and Philippine Islands. The articles are largely scientific and include descriptions of ten new genera and 161 new species and varieties. There is also a series of articles on "Popular and Practical Entomology," which render the magazine more interesting to those who have not yet entered upon a systematic study of insects. It is hoped that more of those competent to write will assist in maintaining this department of the magazine.

During the winter months fortnightly meetings were held in the Society's room at London, at which a variety of addresses were given on popular scientific subjects. The attendance was not as large as might have been expected in a city with such a considerable population and the seat of a university.

The reports from the Branches of the Society at Montreal, Quebec, Toronto, British Columbia and Guelph are highly satisfactory and show much enthusiastic work on the part of the members.

At a meeting of delegates from the various Entomological Societies of the United States and Canada, held at Cornell University during the summer session of the American Association for the Advancement of Science,

our Society was represented by the Rev. Dr. Bethune. Measures were then taken for the formation of a general society to include entomologists of every grade in North America, and a preliminary constitution was drawn up which will be submitted to a meeting to be held in New York during Christmas week.

The most important event of the year as regards our Society was the removal of the headquarters from London to Guelph. Early in May, the President, Mr. J. D. Evans, sent a circular letter to all the members of the Council setting forth the reasons which led to the proposed removal and asking for their opinions on the subject. In a second letter, dated June 18th, he announced that he had received replies from all the members of the Council and that the vote stood in favor of the removal, eleven, and opposed to it four—one member abstaining from voting. He therefore declared that, as the vote in favor of the move was nearly three to one, the decision for the removal to Guelph was carried.

The Society's lease of its room in the Public Library building at London terminated its second year on the 1st of September, and another tenant was prepared to take over the premises at that date and relieve the Society of the remainder of its term of occupancy under the lease. It became necessary, therefore, to carry out the removal before the end of August. The books and collections forming our Library and Museum were carefully packed and brought to Guelph, and are now placed in their new quarters in the Library and Biological Buildings of the Agricultural College. The cabinets with their contents received no injury whatever in transit and are now conveniently arranged for reference in a part of the College Museum assigned solely to them. The Society's books and other printed matter are in a series of stacks in the fire-proof Massey Hall Library building and are kept entirely distinct from those belonging to the College. All the property of the Society continues to be under the control of its own officers and subject to any regulations that they may adopt. A written agreement to this effect between the College and the Society has been executed and a copy is appended herewith.

Much regret is felt by all the members of the Council, and no doubt by the members of the Society in general, that the headquarters should be removed from London, where they were established in 1872. Unfortunately, interest in entomology has almost entirely died out in London, and there seemed to be no one there available for the supervision and care of the library and collections. The sections also of Botany, Ornithology, Geology and Microscopy had, one after the other, ceased their active operations, and no meetings of any of them have been held during the last two years. Under these circumstances, it seemed to the majority of the Council that a change was imperative, and that a removal to Guelph would be in the best interests of the Society, as well as in accordance with the wishes of the Ontario Department of Agriculture. There is already in Guelph a flourishing branch of the Society with a large and active list of members. During the second and third years of the College course attendance at lectures in Entomology is compulsory, and in the fourth year some of the students specialize in the subject and make it a serious and scientific study—these naturally become active members of the Society and will continue their connection with it after they leave the College and scatter over the country. There will also be at Guelph a continuity of work and interest through the permanent staff of a Professor and Lecturer. The books and specimens will be much more largely consulted and the usefulness of the Society greatly extended. It is therefore believed that the removal, which has lately been effected, will conduce to the best interests of the Society.

The Council wishes to put on record its great gratification that one of the oldest and most highly esteemed members of the Society, the Rev. Dr. C. J. S. Bethune, has been appointed to the important position of Professor of Entomology at the Ontario Agricultural College. Dr. Bethune's wide knowledge of entomology and his long experience in teaching fit him eminently to fill this chair, with honour to himself and great advantage to all students who may attend his lectures. Special arrangements have been made with the Government and the President of the College, by which Dr. Bethune's services will be continued to the Entomological Society in the general supervision of its Library and in editing *The Canadian Entomologist*.

It is with much regret that the Council has to record the death of Baron C. R. Von Osten Sacken, one of our earliest honorary members, which took place at Heidelberg, Germany, on the 20th of May. This eminent Dipterist was born at St. Petersburg on the 21st of August, 1828, and for many years was attached to the Russian Embassy in Washington and afterwards was Consul General for Russia in New York. During the twenty-one years that he spent in America he prepared and published a number of works on the Diptera, and to him is due entirely the first scientific knowledge of the North American species belonging to this great order of insects.

We have also to deplore the loss of one of our oldest London members, Mr. Benjamin Green, who for many years took a deep interest in the Society and was a regular attendant at the meetings of the Geological Section. Though prevented by failing eyesight from doing any active work of late years, his interest in science continued unabated and he kept up his connection with the Society to the end.

JOHN D. EVANS, President.

MEMORANDUM OF AGREEMENT BETWEEN THE ONTARIO AGRICULTURAL COLLEGE AND THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Ontario Agricultural College, in consideration of the removal of the headquarters of the Entomological Society of Ontario, together with the Society's library and collections, from London to Guelph, hereby agrees to provide the Society with a separate section of the stacks in the Massey Hall building, for its library, and a room in one of its buildings for the Society's collections and other property: the books and collections, etc., of the Society are to be entirely under the control of the officers of the Society and to continue to be its separate property; they shall also be subject to any regulations that its council may draw up.

The College will provide this accommodation free of any charge for rent or supervision.

The Society shall be at liberty to withdraw from this arrangement and to remove its property at any time, on giving to the President of the College three months' notice of its intention to do so.

Dated this 6th day of August, 1906.

(Signed) G. C. CREELMAN,
President, for the College.

JOHN D. EVANS,
President of the Entomological
Society of Ontario.

ANNUAL REPORT OF THE MONTREAL BRANCH.

The 275th regular, and 33rd annual meeting, of the Montreal Branch was held at the residence of Mr. A. E. Norris, on May 14th, the following members being present: A. E. Norris, in the chair; H. H. Lyman, G. A. Moore, E. C. Barwick, G. R. Southee, G. Chagnon, A Denny, A. F. Winn.

The minutes of the April meeting were read and confirmed.

The secretary read the following report of the Council:—

In submitting their report for the season 1905-06, the Council have pleasure in recording that not only has there been a continued interest in our meetings, but also that there is a growing desire in many directions for accurate knowledge of the habits of insects.

Meetings have been held monthly as usual from October to May, with an average attendance of nine, at the residences of various members. During the summer field-days were held on May 24th and July 1st at St. Hilaire, and Saturday afternoon outings were arranged for, but weather conditions interfered with most of these, and it is to be hoped that the field-day committee will arrange for similar short trips this summer, and invite all interested in natural history to join with us. The branch attended the Natural History Society picnic at Mount Johnson on June 10th, and presented the books for prizes in the Entomological Department, Mr. E. Denny capturing the first prize and Mr. Stevenson the second.

One new member has been added to our roll, Mr. G. M. Stewart, formerly of the Toronto Branch.

The following papers were read at the meetings:—

A Talk on Butterflies and Moths, A. E. Norris.
The Cotton-worm Moth (A. argillacea), A. F. Winn.
Difference between the Sexes in Hemiptera, G. A. Moore.
A Rare Longicorn (Pachyta rugipennis), G. Chagnon.
Hemiptera having Rudimentary Wings, G. A. Moore.
The Tussock Moth Situation in Montreal, H. H. Lyman.
Notes on the Geometridae of Biddeford, Maine, A. F. Winn.
An Account of the Annual Meeting at Guelph, H. H. Lyman.
The Buck Moth (H. Maia), A. F. Winn.
Wings of Hemiptera-Heteroptera. G. A. Moore.
An Interesting Variety of Lina Scripta, G. Chagnon.
Heads of Hemiptera, G. A. Moore.
North American Theclinæ, H. H. Lyman.
Theclas of Great Britain and Ireland, L. Gibb.
Canadian Theclas, A. F. Winn.
The Deaths-Head Moth, Rev. Dr. Fyles.
Notes on some Micro-Lepidoptera, A. F. Winn.
Catocala Relicta, A. F. Winn.
A Hunt for a Borer. H. H. Lyman.
Notes on Apantesis Vittata, E. Denny.

But few additions have been made to the cabinet during the past seasons, and good specimens in any order will be very acceptable.

Mr. Moore has entered up in the Catalogue of Montreal Insects a list of Hemiptera known by him to occur here, making a useful addition.

A beginning has been made in forming a collection of portraits of our members, past and present, and those who have not already handed in their photos are again respectfully requested to do so.

The library has been added to by the receipt of the Reports from New York State, and also the Volumes of the Canadian Entomologist, which have been bound.

At the annual meeting at Guelph, the Branch was represented by Mr. Lyman, and Mr. Winn was elected as this year's delegate to the Royal Society of Canada.

The treasurer's report, submitted herewith, shows a balance to our credit of $49.36.

Respectfully submitted on behalf of the Council,

A. E. Norris, President.

The reports of the treasurer and of the curator and librarian were then submitted and adopted.

The following officers were elected for the ensuing year:—

President—Geo. A. Moore.
Vice-President—E. C. Barwick.
Sec'y.-Treas.—A. F. Winn.
Curator and Librarian—L. Gibb.
Council—G. Chagnon, H. H. Lyman, G. R. Southee and E. Denny.

REPORT OF THE QUEBEC BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The ninth annual meeting of the Quebec Branch of the Entomological Society of Ontario was held at the house of the President on the 13th day of October, 1906.

There were present: The Rev. Dr. Fyles in the chair, Mrs. Fyles, Mrs. J. H. Simmons, Miss Fyles, Miss Bickell, Miss M. Johnstone, Miss Freeman, Miss Hamel, Mr. J. H. Simmons, Lt.-Colonel Lindsay, secretary-treasurer, and two guests.

Dr. Fyles congratulated the members on their re-assembling after the summer holidays. He then told of an excursion he had made through the border townships in the tracks of the Larch saw-fly, *Nematus Erichsonii*, Hartig. He learned that in all that section of the country there was not a first-growth tamarack remaining, and that most of the tamarack of a later growth were destroyed. A few young trees of the kind were growing in places; but a new growth of balsam, poplar, spruce and birch, varying with the nature of the soil, was occupying the broad stretches of land in which the tamarack formerly flourished.

Dr. Fyles exhibited a fine nest of the wasp *Vespa arenaria*, Fabr., which he had brought from the grounds of Mr. George Ramsay, of Little Village, P.Q. It had been built in an open field an inch or so from the ground and was supported by a few stout bents of grass and a small stem of *Aster cordifolius*, L. It resembled a round stone or a large puff-ball, and it contained a surprisingly large number of cells.

While he was examining it at Mr. Ramsay's residence, a fine female—the last of its occupants—burst from her cell and was quickly transferred to the cyanide bottle. This was on the 9th of September. The insect was a beautiful object, jet black with pure white markings; but when it was set up it soon lost much of its beauty: it had become greasy, saturated with oily matter. As the accumulated fat of the bear is its support through its long winter repose, so, probably, this super-abundance of oil in the female wasp is the provision of the insect until the opening spring.

Numerous insects taken by Miss Freeman at her country place at Lorette, P.Q., were also shown. Among them *Tropæa Luna*, L., *Autographa rectangula*, Kirby, *Catocala Briseis*, Edwards, and the handsome beetle, *Chalcophora Virginiensis*, Drury.

Miss Freeman discovered in an unoccupied room—one of the windows of which had been left partly open for ventilation—about a dozen specimens of the beautiful butterfly, *Eugonia j album*, Bois and Le Conte. They had evidently flocked to the room as to a safe refuge from winter storms.

The President exhibited seed of the larger Lady's slipper, *Cypripedium pubescens*, which had come to perfection in his garden. They were contained in a ribbed fusiform pod. To the naked eye they resembled brown dust, but under the microscope they presented a very interesting appearance. Each minute brown seed was attached to the inside of a finely reticulated transparent spindle-shaped capsule, which could be readily carried by the wind, and by this provision the seeds on escaping from the pod are widely scattered.

Lt.-Colonel Lindsay then gave a most interesting account of the Caddis fly frequenting lakes and streams. These flies are very abundant in August and not only the trout are eager to make them their prey, but insectivorous birds gather them with the same intent, so that between the crop of the bird and the maw of the fish—its Scylla and Charybdis—the unlucky insect finds it difficult to steer its course.

The officers for the coming year were then elected as follows: President, the Rev. Dr. Fyles, F.L.S.; Vice-President, Mrs. Richard Turner; Secretary-Treasurer, Lt.-Colonel Crawford Lindsay; Council, Hon. Richard Turner, J. H. Simmons, Esq., Miss Bickell, Miss Freeman, Miss Hedge.

A vote of thanks to the officers, to the hostess of the occasion, and to the authorities of Morrin College for allowing the Society the use of its rooms for its meetings, proposed by Mr. J. H. Simmons, and carried unanimously, brought the proceedings of a very pleasant meeting to a close.

Crawford Lindsay,
Sec.-Treasurer.

Report of the Council.

The Branch now numbers 29 members.

The Secretary-Treasurer's report will be submitted to you and will no doubt be found satisfactory.

In the course of the year, four papers on Ants and one on Aphides were read by the Rev. W. W. McCuaig, and papers on the Tussock and Gypsy moths, European butterflies, Paper-making wasps, the Death's Head moth, and the Arctiadæ of the Province of Quebec, by the President.

The Council regret the departure of Rev. Mr. McCuaig from this part of the country. A vote to that effect was adopted by the Branch.

Our thanks are due to the authorities of Morrin College for having continued to allow us the use of their rooms for our meetings.

Crawford Lindsay,
Sec.-Treasurer.

REPORT OF THE TORONTO BRANCH, 1905-6.

The tenth annual meeting of the Toronto Branch of the Entomological Society was held in the Provincial Museum on June 19, 1906.

The President, Dr. Brodie, was in the chair, and the following were present: Mr. J. B. Williams, Mr. P. Hahn, Mr. H. S. Saunders, Dr. Abbott, Mr. A. Cosens, Mr. Fraser, Miss Mosey, Miss Blackmore, and a number of visitors.

The following officers were elected:
President—Dr. Brodie.
Vice-President—Mr. Paul Hahn.
Secretary-Treasurer—Miss Blackmore.
Librarian and Curator—Mr. J. B. Williams.
Council—Mr. Ivy, Mr. Webb, Dr. Abbott, Mr. R. Hallam.

The Secretary read the following report:

Your Secretary takes pleasure in announcing a successful and profitable season's work. In all, eight meetings in the Museum have been held, and three excursions thoroughly enjoyed by those fortunate enough to be able to attend. The average attendance at the meetings was 10.

Many very instructive papers were read, particularly those of Dr. Brodie require mention, which dealt with insect pests and methods of dealing with them. Papers read during session:

"The Tent Caterpillar," Dr. Brodie.
"Some Recent Additions to the Society's Collection," Mr. Williams.
"Collecting at Niagara Glen," Mr. Hahn.
"Parasitism," Dr. Brodie.
"Insect Intelligence," Dr. Brodie.
"The Tussock Moth," Dr. Brodie (2 papers).
"A Temagami Trip," Mr. Hahn.

One evening during the session was devoted to specimens, and proved very interesting.

Donations to the Society's collection have been received during the past year from Mr. Hahn, Mr. Saunders, Mr. Fraser, and Mr. Williams. Some work has been done in arranging the Lepidoptera, and Mr. Fraser has undertaken to rearrange the Dragon-flies.

Publications have been received from Ottawa and Washington, from the Ohio and Connecticut Experiment Stations, and from New York State Museum, and a copy of "Butterflies of the West Coast" has been procured for our library.

The Treasurer reported a balance on hand of $6.95.

Respectfully submitted,

E. Blackmore, Secretary.

REPORT OF THE BRITISH COLUMBIA BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO FOR THE YEAR 1906.

The fifth annual meeting of the above Branch was held at the Queen's School, Vancouver, on January 26th, 1906.

The following members were present: Messrs. A. H. Bush, R. V. Harvey, R. S. Sherman, W. A. Dashwood-Jones, B. Marrion, J. Towler, R. Draper, F. Foster.

On the motion of Mr. Dashwood-Jones, Mr. Bush took the chair, in the unavoidable absence of the President.

The minutes of the last meeting were read and confirmed.

The Treasurer presented his report, showing a balance in hand, in cash and supplies, of $15.50.

Messrs. J. R. Anderson and F. Foster (junior) were elected members of the Branch.

The retiring officers were re-elected for the coming year: President, Rev. G. W. Taylor; Vice-President, T. Wilson; Secretary-Treasurer, R. V. Harvey.

The Secretary announced that he had approached the Provincial Department of Agriculture with a view to obtaining assistance towards printing a small periodical giving an account of the work of the society. He read a letter from the Hon. R. G. Tatlow, definitely promising aid for one year.

A resolution was passed, accepting with thanks the offer of the Department, and the President and Secretary were empowered to arrange for the publication of a periodical, to be called the "Bulletin of the B. C. Entomological Society."

Two numbers of this Bulletin have already appeared, and the third is on the point of appearing. These numbers contained: Proceedings of the Branch; A Summary of the work done in B. C. up to date; Lists of interesting captures; General articles, and lists of various families of insects as they have been recorded in British Columbia. These comprise: Coccinellidæ (33 species), Buprestidæ (19 species), Cicindelidæ (15 species); in Diptera, the Tabanidæ (18 species), Bombyliidæ (23 species), Therevidæ (1 species), and a list of 28 species of Odonata. (Note by the Secretary.)

Mr. Dashwood-Jones then showed some interesting insects from St. Leon Hot Springs, Kootenay Lake, B.C., determined by Dr. J. Fletcher, including: Basilarchia arthemis, Basilarchia disippus, Nomiades lygdamus, Erebus odora, Catocala briseis, Phengommatæa Edwardsata and Sthenopis quadriguttatus.

Dr. Draper showed a fine series of Lepisesia flavofasciata, var. ulalume.

The meeting then adjourned.

The spring meeting was held at Duncan's, on Vancouver Island, on April 19th.

The following members were present: Rev. G. W. Taylor (President), Messrs. A. W. Hanham, C. Livingston, E. M. Skinner, G. O. Day, T. M. English and R. V. Harvey.

The minutes of the last meeting were read and confirmed.

Messrs. F. Wolley-Dod, G. O. Day, and T. M. English were elected members of the Branch.

Mr. Harvey read a paper on the "Distribution of Insects in North America," calling attention to the far greater similarity between our fauna and that of Europe, than between the latter and that of eastern North America.

Messrs. Livingston and Skinner showed some rare Lepidoptera, the latter having a fine specimen of Sthenopis quadriguttatus, from the Skeena River.

The meeting then adjourned.

REPORT OF THE GUELPH BRANCH.

On the occasion of the forty-second annual meeting of the Ontario Entomological Society, held at the Ontario Agricultural College, Guelph, on October 18th and 19th, 1905, action was taken which resulted in the formation of a Guelph Branch of the Society.

This new Branch was organized with the following officers:

President—Franklin Sherman.

Vice-President—Richard Readwin.

Secretary-Treasurer—T. D. Jarvis.

Committee—Messrs. Sherman, Jarvis and C. R. Klinck.

An encouraging membership of 27 was secured, and the wisdom of the step was shown. The beginning augured well for live and enthusiastic work, and the most sanguine hopes have been fully realized.

During the year sixteen meetings have been held at fortnightly periods, alternating with those of the Wellington Field Naturalists' Club. The attendance averaged thirty and included visitors from the Nature Study classes of Macdonald Institute, and teachers and others from the city of Guelph.

At each meeting talks and papers were presented, which were occasionally illustrated with lantern views. Their nature will be indicated by the following classification which appears on the printed invitations sent out:

General Entomology.

Entomological Literature.

Economic Entomology.

Observations and Notes by Members.

At the conclusion of this one year's work the Branch was merged with the parent society whose headquarters are now at this place.

Tennyson D. Jarvis,
Secretary-Treasurer.

REPORT TO THE ROYAL SOCIETY OF CANADA.

From the Entomological Society of Ontario, through Mr. A. F. Winn, Delegate.

As Delegate from the Entomological Society of Ontario, it is my pleasing duty to report another year of steady progress, and that our membership is increasing very rapidly. At your last meeting the establishment of a branch in British Columbia was mentioned, and since then another had been formed in Guelph, Ont., where there are a number of active and enthusiastic entomologists.

The parent society in London, with its branches at Quebec, Montreal, Toronto, Guelph and Vancouver, and active members in every Province of the Dominion, is able to accomplish much that would be impossible if the sphere of work were limited to a more restricted area.

The last volume, No. 38, of our monthly magazine, *The Canadian Entomologist*, contains 426 pages—a contrast with the first modest one of 110 pages—and is illustrated with twenty-nine figures in the text from original drawings, and seven full page plates, one of the latter being a three-color process plate of moths, showing the beauty as well as scientific accuracy of this style of illustration. Among the sixty-two contributors to its pages, some are from such distant places as Jamaica, W.I.; Honolulu, and the Philippine

Islands. Eleven new genera of insects are described, and one hundred and forty-two new species. Articles on new species and varieties of Lepidoptera, by Dr. J. B. Smith, Dr. Wm. Barnes, Dr. H. G. Dyar, Prof. Fernald, Miss Murtfeldt, Messrs. H. H. Lyman, F. H. Wolley-Dod, A. Gibson, W. D. Kearfott.

Coleoptera, by Prof. H. F. Wickham, Major T. L. Casey, Messrs. Frederick Knab and Wm. Knaus; Orthoptera, by Messrs. E. M. Walker, and W. T. Davis; Hemiptera, by Messrs. J. R. de la Torre Bueno, E. D. Ball, D. Lange, and G. W. Kirkaldy; Hymenoptera, by Dr. W. H. Ashmead and J. H. Lovell; Diptera, by Mr. W. D. Coquillett, Miss C. S. Ludlow and Dr. Grabham. Life histories are given more or less completely of Eupithœcia interrupto fasciata, Apantesis virgo, parthenice and rectilinea, by Mr. A. Gibson; Apantesis proxima, by Dr. O. Siefert; Gortyna thalictri, by Mr. H. H. Hyman; Delphastus pusillus, by Mr. W. E. Britton.

A series of articles on Practical and Popular Entomology consists of the following:

"The Pear-tree Psylla and how to deal with it," by Mr. George E. Fisher; "Entomology in Schools," by Mr. H. S. Saunders: "How do Insects pass the Winter?" by Dr. James Fletcher; "Notes on Collecting Aquatic Hemiptera," by Mr. J. R. de la Torre Bueno; "Canadian Three-color Process Illustration," by Dr. James Fletcher; "The Struggle with the Codling Moth," by Prof. W. Lochhead; "Granary Insects,' by Mr. A. Gibson; "A Method for Measuring Insects," by Mr. J. R. de la Torre Bueno; "The Buffalo Carpet Beetle," by Dr. James Fletcher.

Articles on Classification include a catalogue of the Aphidæ, by Mr. G. W. Kirkaldy; "The Bees of Oregon," by H. L. Viereck and others; "The Three Ranatras of the Eastern United States," by Mr. J. R. de la Torre Bueno; "Mosquito Notes," by Miss C. S. Ludlow.

Among the miscellaneous papers may be mentioned: "Observations on Lampyridæ," by Mr. Frederick Knab; "Notes on Types in the British Museum," by Mr. H. H. Lyman; "Remarkable Flight of Corisa (Water-boatmen)," by Mr. D. Lange; "Spiders of Rockport Cave, Mo.," by Mr. C. R. Crosby; "Influence of the Apidæ upon Geographical Distribution of certain Floral Types," by Mr. J. A. Harris; "Oviposition of Bibio Femorata," by Mr. A. H. Girault.

Book notices have appeared promptly of new entomological works.

The forty-second annual meeting was held in October at the Ontario Agricultural College, Guelph, with an attendance at some of the meetings of over one hundred, and the Society was favored with the presence of Prof. John B. Smith, State Entomologist of New Jersey. Reports were presented on the injurious and other insects of the various districts in Ontario, from the different Branches and Sections of the Society, and addresses and papers were given on a variety of subjects. The thirty-sixth Annual Report of the Society to the Ontario Government has been published, comprising one hundred and forty-four pages, and, as usual, contains a full account of the work of the previous year, and the papers read at the annual meeting, as well as numerous articles of an economic nature, giving to fruit-growers and agriculturists an account of injurious insects along with the best methods of attacking them.

Among these may be mentioned: "A Review of the Mosquito Work in New Jersey," by Dr. J. B. Smith; "Experiments Against the San José Scale," by Prof. Lochhead; "Entomological Conditions in North Carolina," by Prof. F. Sherman; "Reports on Insects of the Season 1905," by Prof. Lochhead, Dr. Fletcher, Dr. Fyles, Dr. Bethune, and Mr. C. Stevenson:

"The Tussock Moths," by Dr. Fyles and Mr. H. H. Lyman; "The Phlox Mite; the Blue Spruce Fly, and, On Bumble Bees that Fertilize the Red Clover," by Mr. T. D. Jarvis; "Forest Insects," by Rev. Dr. Fyles and Mr. E. J. Zavitz; "The Advantages and Disadvantages of the Canadian Entomologist," by Rev. Dr. Fyles; "Butterfly Collecting in Canada," by Mrs. Nicholl; "Orthoptera and Odonata from Algonquin Park," by Dr. E. M. Walker; "Insects as Nature Studies," by Prof. S. B. McCready; "Injurious Insects of the Flower Garden," by Mr. Arthur Gibson.

The library now consists of over eighteen hundred volumes, and a card catalogue according to subjects has been begun. The collections at London are open to the public three days a week, and advantage is taken of this opportunity, the number of visitors being increasing.

The branches are all in a satisfactory state, and our friends in British Columbia have decided to issue a quarterly "Bulletin," the first number of which has just appeared, and contains much information on the insects of British Columbia, particularly on the Coleoptera. It was felt that, as the members in that Province are so widely scattered, a medium of communication would bind them together, and we should like to see the members in the Maritime Provinces and also in the North-West follow a similar course, so that our Society could have a chain of branches from the Atlantic to the Pacific.

REPORT OF THE LIBRARIAN AND CURATOR.

During the year ending August 31st, 1906, thirty-eight bound volumes have been added to the Library, making the total number on the register 1900, also a large number of periodicals and pamphlets. Among the new books may be mentioned the Autobiography of the late Miss Eleanor Ormerod, LL.D.; Mr. A. G. Weeks's Illustrations of South American Diurnal Lepidoptera; the second part of Prof. Packard's Monograph of the Bombycine Moths; Mr. W. G. Wright's Butterflies of the West Coast of the United States; and Prof. Needham's May-flies and Midges of New York. During the year 38 volumes were issued to local members.

Owing to his appointment to the Professorship of Entomology at the Ontario Agricultural College, which took place on the 1st of June, the Librarian and Curator was absent from London during the last quarter of the Society's year. There are, therefore, few acquisitions to the collections to be recorded for this season, and the attendance of visitors during the summer months was almost entirely precluded. The following contributions have been made to the collections since our last report, and our grateful thanks are due to the kind contributors: 35 specimens of Lepidoptera, Coleoptera and Hymenoptera, by Dr. James Fletcher, Ottawa; 23 specimens of Lepidoptera by Mr. H. S. Saunders, Toronto; 118 specimens, representing 63 species of Manitoba Coleoptera, by Mr. Norman Criddle, Aweme, Man.; 22 specimens of Coleoptera, by Dr. A. H. R. Watson, Port Hope; 6 specimens of Coleoptera, by Mr. A. C. Baker, London, and a number of interesting specimens of various orders by Mr. J. A. Balkwill, London.

The removal of the Society's books and cabinets and other property from London to Guelph has been safely accomplished without any appreciable injury to the specimens, and all are now placed in their new quarters in the Massey Hall Library and the Biological Building at the Ontario Agricultural College.

Respectfully submitted,

Charles J. S. Bethune,
Librarian and Curator.

AUDITORS' REPORT.

For Year Ending August 31st 1906.

Receipts.		*Disbursements.*	
Bal. on hand Sept. 1st, 1905	$517 76	Pins, cork, etc.	$ 26 95
Members' fees	399 67	Printing account	863 19
Sales of pins, cork, etc.	41 38	Rent	140 00
Sales of Entomologist	190 50	Insurance	24 00
Advertisements	46 91	Expense account, postage, moving, etc.	204 37
Interest	7 20	Annual Meeting and Report	172 81
Government Grant	1,000 00	Library	12 35
		Salaries	237 50
		Balance	522 25
	$2,203 42		$2,203 42

A HUNT FOR A BORER.

By H. H. Lyman, M.A., Montreal, Que.

On pages 154-156 of Vol. VIII of the *Canadian Entomologist*, published in August, 1876, appeared a paper, ostensibly by Dr. Leon F. Harvey of Buffalo, describing four species of new Noctuidæ, one being *Gortyna Appassionata*. The single type specimen had been received from Mr. E. B. Reed of London, Ont. I believe it was later claimed by Grote that he wrote Harvey's descriptions, and the type specimen was doubtless sent for name to Grote, and remained in the Grote collection and passed with it to the British Museum. On the rediscovery of the species, Grote disclaimed responsibility for the name, which he said was not Latin but Italian. Although there were a very few unrecognized specimens of this species in American collections, such as the collection of the American Entomological Society of Philadelphia, the species remained unknown save for its name in the catalogues and the one type specimen in the British Museum, though certain strongly marked specimens of *Marginidens* were identified with it by a prominent entomologist, who had seen the type on a visit to London. The description was accurate enough with certain exceptions which I, at least, fail to understand. The ground color of thorax and wings was stated to be "of a dark red color, the terminal space glistening red, subterminal space wide, concolorous purple." The last clause I consider misleading, as in many specimens the space from the t.p. line to the margin is of a uniform deep brownish red color, with only the faintest indication of the subterminal line, but I confess that in one of my specimens the space between the t.p. and s.t. lines has a purplish tinge which renders it darker than the space beyond, but the statement which I consider most incomprehensible is that "it is allied to *Nitela*, differs from it by the wider, rounder reniform, the three larger superposed spots on the t.a. line, the wider concolorous subterminal space and the more regular lunulate t.p. line."

In 1901 or 1902, Mr. Louis H. Joutel, as Mr. Bird has so interestingly told in Can. Ent. XXXV., 91-94, discovered an unknown larva of the genus, Gortyna, Hydrœcia, Papaipema, or what you will, feeding in the roots of the Pitcher Plant (*Sarracenia Purpurea*) in the pine barrens near Lakewood, N. J., and Mr. Bird, having secured a supply of larvæ and food plant, was able to carry to maturity a goodly number of specimens, many of which, with his usual generosity, he distributed to important collections.

Fired with the ambition to secure this beautiful and rare species, I determined to take an early opportunity of seeking it in the locality whence came the type and so prolonged a business trip to Toronto into an entomological expedition to the then headquarters of our Society.

I left Toronto by the International Limited on the afternoon of July 9th, 1903, reaching London the same evening. After supper I called upon Mr. Dearness, who very kindly advised me as to the best remaining locality in which to look for the food plant, and promised to see Mr. Balkwill in the morning as to the most likely guide to the happy hunting ground. The next morning Mr. Balkwill called for me at the hotel and after some delay we succeeded in chartering a vehicle from a livery stable with a boy to go with us. We drove some distance into the country to a likely swamp, and then, leaving the vehicle in charge of the boy, Mr. Balkwill led the way to where the Pitcher Plants grew. There were no great masses of them, and probably they do not grow that way, but they were scattered about here and there through the swamp. I searched many but found no larvæ nor even any trace of them. Once I thought I had found one, as there was frass among the leaves near the root, but I found it had evidently dropped from some larva on the tree above, and the plant was without any borer. Now, I could never be mistaken about the frass of this species as it is reddish in color. After spending over an hour in the hunt without success, I abandoned the search and went with Mr. Balkwill to where cocoons of Samia Columbia had been found on larch in another part of the swamp, but saw none. We then returned to the city.

The next year I made a trip to Italy and so had no opportunity of looking for this species, but last year I determined to make another attempt, and as I also wanted to make a hunt at Kittery for *G. Harrisii*, I planned a four days' trip to Prout's Neck, Me., to search for these species, have a few dips in the sea, and a little golf. I left home on the evening of the 22nd July, and arrived at my destination before 11 a.m. the following morning, and in the afternoon set out accoutred for the chase. It is a good walk from Prout's Neck to the locality I was in search of, which I had not visited for nearly twenty years, and when I found the place my heart sank, as the area where the Sarracenia grew was so restricted, not occupying more than about a fifth of an acre between a wood which shut it off from the road and a salt marsh. However, I set to work, and as the result of about two hours' work secured three nearly mature larvæ. I then set out on a brisk walk to the hotel, happy at my success.

The next day was bad, as it rained all day, but towards five o'clock the rain stopped and the sun came out, and I sallied forth for a walk, though it was too late to go to the Pitcher Plants. After going for some distance along the road, I came to where some evening primroses grew and started a hunt for that lovely moth which used to be called *Alaria Florida*, but for the present is known as *Rhodophora Florida*, and secured quite a number of them asleep in the blossoms. I then turned off from the road across a stretch of meadow land to a drainage ditch along which the Poison Hemlock (*Cicuta Maculata*) grew abundantly, and in a very short time I had secured over a dozen practically mature larvæ of *G. Marginidens*, which Dr. Holland calls a rather scarce species, and only left off grubbing them up because I had filled up all my tin accommodation with the roots and enclosed larvæ, and I believe I could have easily gathered fifty.

The next morning I again visited the Pitcher Plants and devoted nearly two hours more to the search, and having secured two more larvæ and a newly formed pupa, which I took to be of this species and which was dis-

closed on pulling up a Pitcher Plant, I contented myself, as I did not want to clear the locality, and so kill the goose that lays the golden eggs.

This species will, I think, always be rare in collections as the difficulties in the way of securing any large number are so great. It requires most patient search to find them, and the root of the plant is so small that it takes two plants, at least, if not more, to nourish a single larva. They appear to enter the root from the crown among the bases of the petioles of the pitchers, and when all the edible part of one root is consumed they go to another, and I found several bored roots which had been abandoned. The beautiful crimson of the moth is evidently derived from the food-plant, as even the frass is red.

The plants in the locality visited by me grow among a very spongy moss and the larvæ when full fed appear to leave the roots before pupating, and in my breeding jars they pupated in the moss. Having provided myself with a sufficient supply of the roots to bring the five larvæ to maturity, I felt that that portion of my expedition had been successfully accomplished, and in the afternoon played a couple of rounds over the course of the Owascoag Golf Club with a good conscience.

The next morning I took the train for Kittery Junction, and from there the next train to Kittery Point, a very short distance, and then set out to walk. Morning and afternoon I must have tramped fifteen miles, but did not find a single plant of *Heracleum Lanatum*, the food-plant of *G. Harrisii*, and I found little except a further supply of *Rhodophora Florida* in the flowers of Œnothera. In the late afternoon I returned to Portland, and left for home by the night train, which I reached on the morning of the 27th.

The five larvæ duly pupated and were taken with me on the eclipse expedition to Labrador. Just before leaving, the pupa which I had found disclosed the imago and proved not to be a Gortyna at all. Of the five pupæ reared, one died, one moth was unable to emerge. I performed a delicate surgical operation and removed the pupa case, but the wings would not expand. One emerged and apparently hid among the moss and so escaped notice and damaged itself, so only two perfect specimens were secured.

Postscript.—Mr. C. H. Young of Hurdman's Bridge, near Ottawa, who has been very successful in rearing *G. Appassionata* during the season of 1906, has favored me with the following notes through Dr. Fletcher:—

On July 12th, he found the larvæ in large numbers in a very wet swamp at the upper end of Meach Lake, Que., about fifteen miles north of Ottawa, at which time they were about half grown, but were full grown by the 25th. He noticed particularly that they were found only in the large plants and where the plants grew very thickly. According to Mr. Young's observations, the larvæ leave the root of the Pitcher Plant when mature, and pupate among the old decaying pitchers that are at least two years old and lie out among the moss. A very large proportion of the larvæ found by Mr. Young were attacked by a fungoid disease or by insect parasites of two species, one hymenopterous and the other dipterous.

TWO INSECTS AFFECTING RED CLOVER SEED PRODUCTION.

By Tennyson D. Jarvis, Ontario Agricultural College, Guelph.

The question of clover seed production is one of extreme interest to all who have the prosperity of agriculture at heart. While the seed cannot be considered as a staple money crop in most sections, the use of the plant

has become so extensive and well-nigh universal, that the supply of the seed is becoming more and more a matter of paramount importance. The increased use of clover is indicated by the decided advance which has already taken place in the market price of the seed; and from this circumstance it is less than ever before keeping pace with the demand for it. It would seem the natural conclusion that interest should be stimulated in the production of such a remunerative commodity, and the fact that it has not been to a sufficient extent to control the price, suggests that there may be some offsetting factors to be taken into account—which is indeed the case. A reference to the annual reports of the Bureau of Industries of Ontario, reveals almost invariably a more or less unsatisfactory yield of clover seed. Furthermore, in examining carefully a large number of heads of clover here this fall, it was found that only 42 per cent. of the florets had produced seed, and undoubtedly the percentage is frequently much lower than it is this fall. It is not unusual for the yields to be so low as to render the harvesting unprofitable. In fact so uncertain and precarious a crop is it, that on a commercial scale it is a regular crop in only comparatively limited sections of Ontario, and in the other Provinces of the Dominion is but little grown. This general uncertainty of obtaining a reasonably full yield of seed is due to various causes. The plants on heavy or undrained land may be weakened by winter heaving; or on light soils their growth may be checked by summer droughts. The soil in some sections is so deficient in its retentiveness of moisture, that it is only in exceptional years that any considerable aftermath is produced. Insect ravages, and imperfect fertilization are two other causes. In the present article we propose to deal only with the two latter factors, showing how the presence of certain insects, and the absence of certain others, combine to affect adversely the yields of clover seed.

There are fully a dozen insects which do appreciable injury to some part or other of the red clover plant, but by far the most destructive to the seed is the Clover Seed Midge (*Cecidomyia leguminicola*). This insect has gained a wide range in America, and every year causes an immense depreciation in the yield of seed. It is estimated that the loss in Ontario ranges in various localities, all the way from 25 to 75 per cent. In an examination of 50 heads of clover late in September, when in all probability some of the midges had already escaped, 164 of their larvæ were found.

The insect which is responsible for this destruction is a minute two-winged fly, which appears in May or early June, and lays its eggs on the developing heads of clover among the bristles which surround the young florets. From these eggs, which are so small as to be almost invisible to the naked eye, the larvæ hatch and find their way down the opening corolla tubes to the future seed at the base. Small as they are they may be readily seen if placed on a white surface, and appear variable in color from whitish to orange-red. They feed on the doughy seeds until fully-grown, about the last week in June, when they emerge from the florets, and dropping to the ground transform to the pupal stage just below the surface. The pupæ develop to the adult fly in time that these may lay their eggs upon the second growth of the clover for another brood of the maggots. Thus both crops of clover are attacked, and after the damage is done the midges remain to go into hibernation until another year's supply of food is ready.

In order to combat this pest, it is only necessary to bear in mind the date at which the first brood is likely to pupate; and by cutting the crop a little in advance of this time destroy the whole brood, or by pasturing until danger from the first brood is past, prevent altogether the deposition of the

eggs on the crop. In accordance with this, it is now recommended to pasture closely until the month of June, when the clover may be allowed to grow for a late crop of seed; or if the crop has been left for hay, to cut this not later than June 20th, and obtain the seed from a second crop. Where these rules are observed, the injuries of the midge can be largely avoided. However, so long as some growers persist in disregarding them, it will find ample means of propagation; and so long the rest must expect to be obliged to maintain their precautions.

Having seen how the presence of one insect is so inimical to success in clover seed production, we will notice next how the presence of another is essential to the same.

Red clover, particularly the first crop, often fails to produce seed freely owing to imperfect fertilization. To understand this we need to notice two facts: 1. This plant is incapable of self-fertilization, and is therefore dependent on outside agencies for the performance of this office; and 2. The flower is so constructed, that very few of the agencies which operate in the cross-pollination of other flowers can take part in this case.

1. Inability to self-fertilize.

Many plants are known which, owing either to the structure of their flowers, or the ineffectiveness of the pollen on the pistils of the flower from which it is derived, do not self-fertilize. The red clover is an example as we shall notice presently. The flowers or florets of which the head is composed, have the four sets of organs which we find in other complete flowers. The corolla is a long tube having its lobes curiously fashioned so as nearly to close the opening or mouth. Within and enclosed in the lower lobes called the keel, are the pistil and surrounding it the monadelphous stamens. Notice particularly that the stigma of the pistil reaches up beyond the anthers of the stamens. Owing to this peculiarity, the pollen in falling does not usually come in contact with the stigma, and the plant evidently requires the intervention of insects for its pollination. That this is the case has been repeatedly proved by the exclusion of insects from the clover plants, with the result that under such circumstances no seed was produced.

2. Limited number of agencies which can pollinate red clover. Since insects do so much in carrying pollen between other plants, let us see why they are not equally useful here. We notice by examining a floret, that in order that pollen from another flower may come in contact with its stigma, it must be borne by some insect which in lighting on the keel, is heavy enough to pull it down so as to release the essential organs (pistil and stamens) from it; and then in probing with its proboscis for the nectar at the base of the corolla, will brush on to the stigma any pollen which may have become attached to it in visiting other flowers previously. The nectar, or sometimes the pollen which it bears, is the incentive which brings insects to a flower; but in the case of the red clover, the neck of the corolla tube is so long, that of the insects heavy enough to open the flower, only a very few have mouth parts long enough to reach the bottom. Bumble bees (*Bombus*) of various species, are practically the only insects which so habitually visit the flowers of red and mammoth clovers, as to be entitled to notice as a factor in their pollination. It is claimed that wasps often visit the flowers for honey, but instead of entering at the mouth in the orthodox manner, they cut a hole in the side within reach of the honey. Bumble bees have also been charged with this to some extent, and honey-bees will follow and utilize the holes thus made, but do not enter the flower; and so do not effect pollination. However, there is no doubt that bumble bees ordinarily visit the flower in such a way as to bring pollen to the stigma.

The honey bee seeking pollen and some other insects may occasionally be factors in this work, but cannot be considered as of any importance in comparison with the bumble bee. That these statements are based on fact may be strikingly seen in the experience of the New Zealand growers of clover seed. In that country attempts to obtain home-grown seed were scantily rewarded until, about 1885, the British Government introduced several species of bumble bees. These insects reproduced rapidly, and have effected a vast improvement in the yields of seed obtained. So manifestly beneficial did they prove, that the New Zealanders are now looking about for still further species which they might with advantage import. In the summer of 1905 a letter was received by the Ontario Department of Agriculture from the Canterbury Agricultural and Pastoral Association of New Zealand, seeking information as to what species of insects perform the service of pollination in this country, in the hope that some superior to what they have might be secured.

There are in America as many as fifty or sixty distinct and described species of bumble bees. Only a few of these, however, are sufficiently plentiful to be of economic importance. In an excursion through a clover field at Guelph this fall, three species were collected, namely, *Bombus fervidas, B. ternarius, and B. borealis*; the first of which was by far the most common. About Toronto another species, *B. consimilis,* is reported by Dr. Brodie as one of the most numerous.

Since the bumble bee plays such an essential role in connection with the production of clover seed, it will be worth our while to enquire into its life history and habits, for thereby we shall be enabled to arrive at some important practical conclusions.

Bumble bees, like the honey bees of domestication, have among them three kinds of individuals; the queens or females, the males, and the workers or undeveloped females. All these will be found in a colony in the fall; but on the approach of winter, the males and workers all perish, and the fertilized queens alone go into hibernation, to perpetuate the species another year. They remain in sheltered places, and in the spring those which have survived, set out separately to found each a colony of its own. The first care is to find a suitable place for the nest which is to be the home. They often appropriate deserted nests of field mice, and also construct nests for themselves of dried grass, or moss, or of wool, locating them in a depression in the ground. In this is stored a mass composed of wax, pollen and honey, in the latter part of which a number of eggs are at once deposited. Other cells similar to the first are added from time to time, and more eggs deposited as fast as their accommodation can be provided for. Owing to this method of procedure, the resulting comb receives the characteristically aimless construction with which we are so familiar.

As the young larvæ hatch, they feed upon the mass of pollen and honey in which they lie. When fully grown, each spins a lining to the cell which it has formed, and transforms to the pupal stage, finally emerging by gnawing its way out as a perfect bumble bee. After being thus emptied, these cells are not used again for the same purpose, but become the receptacles for the honey which is collected by the new brood of bees. For some time only workers are produced, and as they become numerous enough the queen is relieved from the various duties of collecting material, building comb, and so forth, all of which she has performed until now, and devotes her energies exclusively to the laying of eggs. Thus by the end of summer a populous colony may have been built up from the slender beginning of the spring. About this time, young queens and males also are produced, and

so when cold weather breaks up the colony, a number of queens are left to multiply colonies the following year.

This gradual increase from individuals to colonies of bees accounts for the greater yields of seed usually secured from a crop of clover late in the season. The flowers of the first crop opening in the latter part of June are not, as is sometimes supposed, any less capable of setting seed; but since they must be fertilized in order to produce seed, it follows that the yield will be in some proportion to the numbers of the bumble bees, and consequently greatest in the fall.

The practical applications which we may now make of the information we have about these two insects, the clover seed midges and the bumble bee, can be presented as follows. The life histories of both alike demand that a late crop of clover be used for seed; and therefore it is the utmost folly to strive to produce it at the time when Nature's odds are most strongly against us. The abundance of bumble bees, which is so much to be desired, may be materially augmented by a policy on our part of "letting live." An instinctive impulse which seems to be inherent in man, and persists long after he has lost the overflowing animal spirits of youth, makes the lot of the bumble bee a precarious one. In so far as we can, then, let us inspire youth with a considerate regard for the rights of the weak creatures, which are so often our friends; so that these thoughtless raids may appear to them despicable as they truly are, and if we ever find that the chance discovery of a bumble bees' nest stirs up in us some latent spirit of adventure, let us firmly suppress it as befitting a worthier occasion.

INJURIOUS INSECTS OF 1906 IN ONTARIO.

By C. J. S. Bethune, Ontario Agricultural College, Guelph.

Owing to my removal from London to Guelph in the early part of June, and subsequently the transfer of the property of the Entomological Society to its new quarters, my opportunities for outdoor observations have been somewhat limited during the past summer. I have, however, received a large number of enquiries, generally accompanied with specimens, from various parts of Ontario, and frequently visitors to the College have brought injurious and other insects for identification and information. In this way I have been enabled to learn something about the most troublesome insects of the season and their distribution throughout the Province. The extensive gardens, field-crops and plantations on the College premises have also afforded convenient places for the detection of injurious species. There has been no one great outbreak to mark the year, but many forms have been more abundant than usual and nearly all the common pests have been as destructive as ever.

Garden Insects.

The White Fly (*Aleyrodes vaporariorum*, probably) also called the Mealy-winged Fly, has been very abundant this year. My attention was first drawn to it by its occurrence in large numbers on greenhouse plants, such as fuchsias, roses, etc. In the early part of July, in order to make alterations in the greenhouses, all the plants were brought out-of-doors and remained there during the rest of the summer. Owing to this, in all probability the White Flies were subsequently found on a large number of

plants in the vegetable garden, viz., beans, beets, carrots, cucumbers, parsnips, radish, rhubarb, salsify, squash, summer savory, tobacco, tomatoes; and on sunflowers and hollyhocks and a number of perennials in the flower garden. It, or probably another species, was also abundant on wild ginger. The waxen scale-like cases, under which the larvæ live, were to be found in

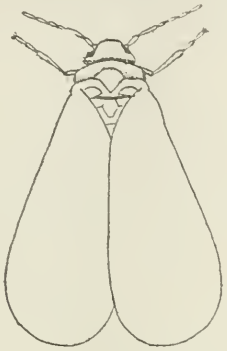

Fig. 3.—Mealy White Fly. Greatly enlarged. (After Gossard).

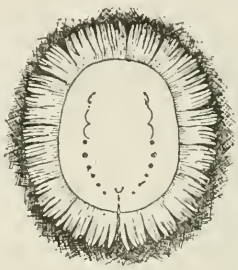

Fig. 4.—Scale-like covering of the larva. Greatly magnified. (After Gossard).

large numbers on the leaves and stems of the affected plants. In many instances considerable damage was done, not only by the loss of sap drawn off by these sucking insects, but also by the growth of fungus on the "honeydew" that is secreted by the larvæ on the foliage beneath them. The only remedy for them appeared to be spraying with kerosene emulsion. Where a greenhouse is infested fumigation with hydrocyanic acid gas should be resorted to. The accompanying figures (figs. 3 and 4) represent the characteristic forms of the fly and the scale-like covering of the larva; both are very greatly enlarged.

Fig. 5.—The Tarnished Plant-Bug, much enlarged (after Lugger).

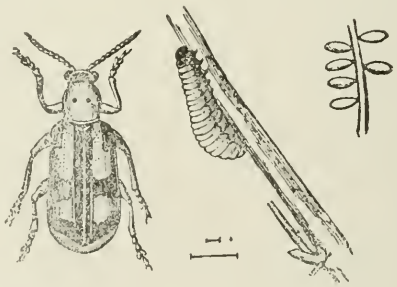

Fig. 6.—The Blue Asparagus Beetle; eggs and larva—magnified.

The Tarnished Plant-bug (*Lygus pratensis*) was another very abundant insect this year. It was first noticed in large numbers on the chrysanthemums that had been brought out of doors from the greenhouses; it attacked their terminal shoots and thus injured and in some cases destroyed the buds and future flowers. It was also to be found on asters and a number of other flowering plants in the borders, and on asparagus, beets, carrots, celery,

parsnips, potatoes, salsify, etc., in the vegetable garden. Early in the season it did some damage to strawberry and currant blossoms. This is a true bug and, like all the other members of the order, obtains its food by piercing the tissues of the plant it attacks and sucking out the juices. The adult insects (fig. 5) are about a quarter of an inch in length and vary in colour from yellowish-green to a dark brown. It may easily be recognized by the yellowish lines on the thorax and the yellow V-shaped mark just behind them on the scutellum. Choice plants may be protected by dusting with Pyrethrum insect powder mixed with three or four times its weight of flour and applied in early morning when the insects are sluggish and the foliage is moist with dew. On a larger scale kerosene emulsion or a decoction of tobacco may be used with advantage, if applied early in the morning before the bugs become too lively.

The two species of Asparagus Beetles, the Blue (*Crioceris asparagi*) and the 12-spotted (*C. 12-punctatus*) were very abundant all through the season, and were to be found on the plants as late as the end of September. Until last year the latter species alone was to be found, but now the Blue Beetle (fig. 6) has caught up to it here on its spreading movement northward and westward. Both species have no doubt come to stay, and it is a pest that will have to be reckoned with by asparagus growers from now onward, just as we have the Colorado potato-beetle always with us. In spring when the shoots are being cut for table use, the beetles may be kept off by dusting with lime; later on, when the plants have grown large, the larvæ of the Blue species will be found feeding upon the foliage and may then be destroyed by dusting with a mixture of Paris Green and lime, or with flour instead of lime, which is often difficult to procure. These larvæ are somewhat slug-like in shape and are of a greenish colour. The larvæ of the other species, the 12-spotted, feed upon the seeds of the asparagus plant and live inside the round pods. They cannot, therefore, be treated with poisons, but may be got rid of by cutting down and burning all the seed-bearing plants as soon as the pods have attained their full size and are beginning to turn red.

Fig. 7.—The Blue Asparagus Beetle. Enlarged 8 times. (After Chittenden, U. S. Dept. Agric.)

Fig. 8.—The 12-Spotted Asparagus Beetle. Enlarged 8 times). After Chittenden, U.S. Dept. Agric.)

Both beetles are often to be found on the same plant and may easily be recognized, one (fig. 8) being of a reddish-orange colour with 12 round black spots on the wing covers; the other (fig. 7) is of a shining blue-black colour with white blotches on the wing-covers. These vary a good deal in size and shape and sometimes form a cross of the ground colour on the back. They pass the winter in the adult state and are ready to attack the asparagus shoots

as soon as they appear above ground in the spring. Like many other hibernating insects, they take shelter under rubbish, and thus afford another argument for clearing up and burning all garden refuse in the autumn.

The Parsnip Borer (*Depressaria heracliana*, De Geer) is an old enemy, though not a very common one, of the second years' growth of parsnips, both cultivated and wild. This year it proved injurious to some plants in the College garden. The full-grown caterpillar is about three-quarters of an inch in length, of a dirty green colour above and yellowish on the sides and beneath, with a number of shining black warts on nearly all the segments. The young larvæ first attack the large umbels of flowers, covering them with a web, which is rendered very unsightly with masses of excrement. When the flowers have been all devoured, they burrow into the hollow stems, usually entering at the axils of the leaves and there feed upon the soft, white lining. If, however, there should be young parsnip plants near by, some of the larvæ are apt to attack them and eat up the tender foliage. By the middle of July they begin to turn into the chrysalis state and the small moths appear in August after a fortnight spent as pupæ. This year the first moths in captivity came out on August 15th, but we have sometimes had them as early as the 1st of the month. The moths are dull gray, varied with black scales and blotches, and have a flattened abdomen with projecting scales at the sides. They have a habit, like some others of the genus, of coming into houses and secreting themselves behind curtains and in garments, and are consequently mistaken for clothes moths. A full description of the insect in all its stages is given in the *Canadian Entomologist*, vol II., pp. 1-4, 1870. The only remedy for the attack seems to be the cutting off and burning all the infested flowers and stems.

Among the familiar insects against which the gardener has to contend every year, may be mentioned the Zebra Caterpillar (*Mamestra picta*), which was found devouring the foliage of beets, in addition to its usual attacks upon cabbage, turnips and other plants.

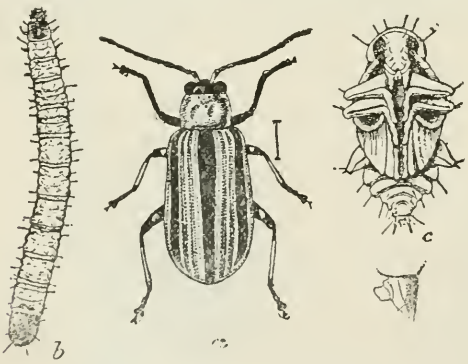

FIG. 9.—The Striped Cucumber Beetle: *a* beetle, *b* larva, *c* pupa. Enlarged 8 times. (After Chittenden, U. S. Dept. Agric.)

FIG. 10.—The Spotted Cucumber Beetle.

The Striped Cucumber-beetle (*Diabrotica vittata*)—fig. 9—and the spotted species (*D. 12-punctata*)—fig. 10—were both abundant during the later part of the summer in the blossoms of pumpkins and squashes; this was the second brood, the adults of which pass the winter as beetles, and are ready to attack young plants of the cucurbitaceous family as soon as they appear above ground in the spring. The second brood, though numerous, does no appreciable damage in the summer and autumn, as the plants are then so large and vigorous that the attack is unnoticed.

The root and stalk borers (*Gortyna nitela*—fig. 11—and *cataphracta*) were much complained of this year. The former was found in potato stems, and the latter was reported by Mr. C. W. Nash, of Toronto, as attacking all kinds of perennial plants in gardens, and also corn and tomatoes. It is difficult to prescribe any remedy for these insects, as they work out of sight and their presence is not suspected till they have seriously injured the plant.

Attacks by various species of Plant-lice (*Aphis*) were complained of in different parts of the Province; on Brussells-sprouts, for instance, at Stratford; on turnips at Grenfel; on hops at Shelburne; on sweet-peas at Penetanguishene; on honeysuckle at Toronto, etc. The ordinary remedies of spraying with kerosene emulsion or whale-oil soap wash have usually proved effective.

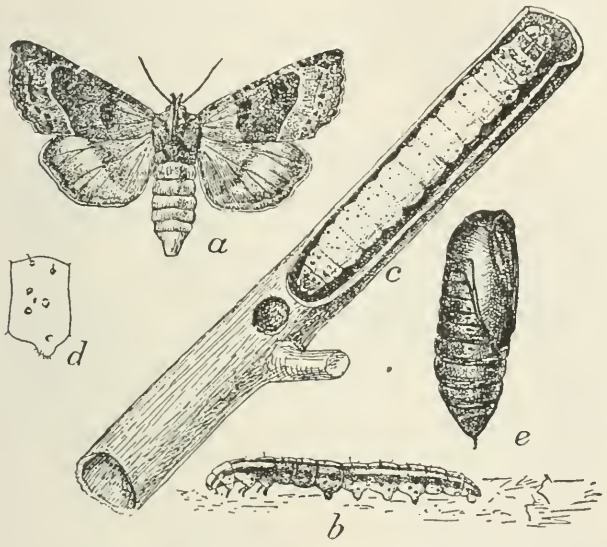

FIG. 11.—The Root and Stalk Borer (*Gortyna nitela*). *a*, female moth; *b*, half-grown larva; *c*, mature larva in injured stalk; *d*, lateral view of abdominal segment of same; *e*, pupa—all somewhat enlarged. (After Chittenden, U.S. Dept. Agriculture).

The Turnip Maggot (*Phorbia brassicæ*) was seriously injurious at Markdale, and the Onion Maggot (*Phorbia ceparum*) at Woodstock. For these underground insects there has not yet been found any perfectly effective remedy. In the case of the species attacking onions, it is recommended to dust the rows of plants with white hellebore once a week from the time that the young plants appear above ground; later on, when the bulbs are forming, the earth may be removed down to the roots and the exposed part dusted with white hellebore. The attack on turnips is not usually very severe, but the same species is liable to injure cabbages and radishes. It may be dealt with by spraying with a carbolic wash made of one quart of soft soap (or one pound of hard soap) in a gallon of water with half a pint of crude carbolic acid; this mixture should be boiled for a few minutes and when required for use, diluted with fifty parts of water to each one of the mixture. The application should be made once a week to the growing plants until the danger of attack is over.

Cut-worms and Wire-worms have given trouble in many places; at Mount Charles the Colorado Potato-beetle attacked and did considerable

damage to tomato plants. Cabbage-worms (*Pieris rapæ*) were very abundant this year, and were especially injurious to cabbages and Brussels sprouts, as well as to mignonette and nasturtiums in the flower garden.

White-grubs, the larvæ of May-beetles or "June-bugs" (*Lachnosterna*) —fig. 12—caused much damage to the roots of strawberry plants at Wallace, and were grievously complained of in consequence of their injury to lawns and golf-links at London, Woodstock, Paris, Watford, Durham, Coldstream and elsewhere. In the case of lawns and boulevards in cities and towns, where the affected area is not very large, spraying liberally with kerosene emulsion and washing it in with plenty of water, has been found somewhat effective. When the roots of the grass are so devoured that the turf will roll up like a carpet, which was the case in some places, it seems as if the only plan would be to remove a few inches of the soil beneath the sod containing the grubs, and then to replace with fresh earth and resod. In an enclosed garden poultry may be turned in to devour the grubs; robins and other birds render useful assistance also. Where the attack is on golf links, it would be found serviceable to enclose the infested spots with hurdles

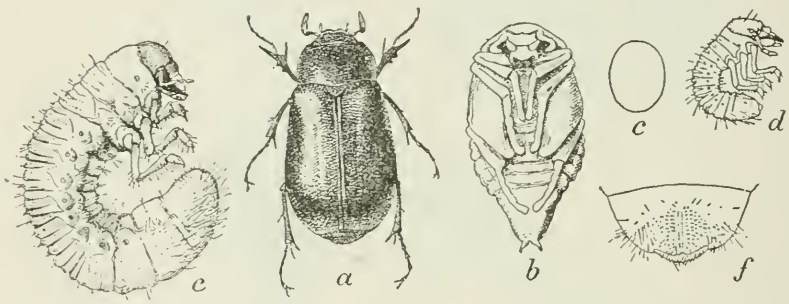

FIG. 12.—May Beetle: *a*, beetle; *b*, pupa; *c*, larva (White Grub)—slightly enlarged. (Chittenden, Bull. 19, n.s. Div. of Ent., U.S. Dept. of Agr.

and turn in a few pigs; these would soon root up and devour the grubs and could then be removed to another place. The parts of the field thus treated might then be levelled and resodded or sown with grass-seed. In ordinary cases the grubs thrive in old pastures, where they live underground for two or three years. A proper rotation of crops and the breaking up of all such fields is by far the most effective method of dealing with the insect. When the beetles are flying in May and June and doing much injury to the buds and foliage of trees and shrubs, spraying with Paris Green will kill large numbers; they can also be attracted by lights and destroyed. Boys also might be employed to gather them in early evening, and to search for them in their hiding places beneath the soil, along fences and against buildings.

FIG. 13.—Red-legged Locust.

While referring to pasture lands it may be mentioned that the Red-legged Locust (*Caloptenus femur-rubrum*)—fig. 13—was more than usually abundant this year throughout western Ontario and consumed a considerable amount of grass and cereals.

Fruit-tree Insects.

The Oyster-shell Scale, or Bark-louse as it is usually called, (*Lepidosaphes ulmi*) is now wide-spread on apple-trees all over Ontario and has become through neglect a serious injury. Twigs completely encrusted with the scales have been sent in from many places, our correspondents fearing that they had to deal with the dreaded San José scale. On the College trees the lime-sulphur wash has been found thoroughly effective. When properly made and carefully applied in early spring, before the buds begin to swell, it completely removed the scales and left the trees clean; at the same time it destroyed other insects which attack the buds. In previous reports full descriptions have been given of the methods of making the wash and the proportions of the ingredients, it is unnecessary therefore to repeat them here.

The Rose-chafer (fig. 14), or Rose-beetle (*Macrodactylus subspinosus*) has been remarkably abundant this year. Specimens have been sent or brought to me from Toronto on the east, to the County of Essex on the west, but none from localities east of Toronto. In the Niagara District and here

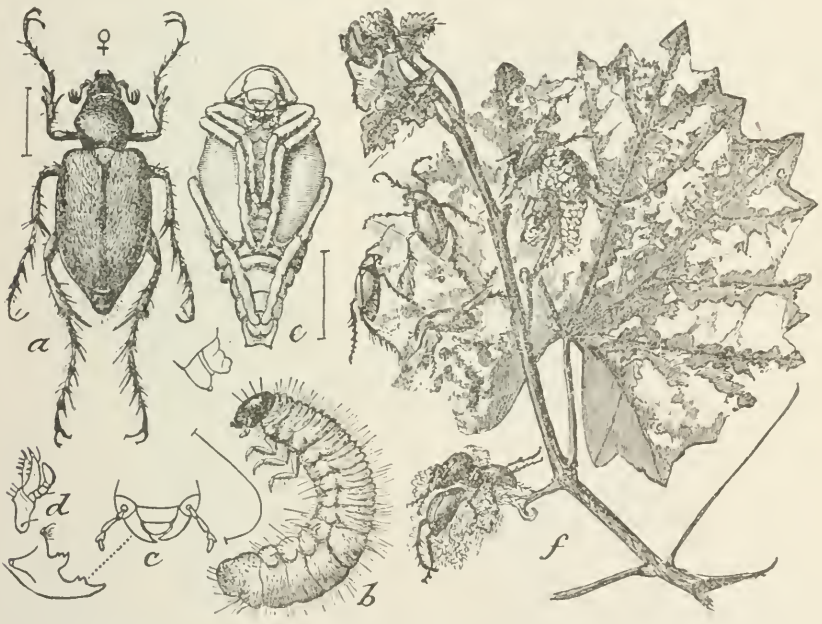

Fig. 14.—Rose Chafer (*Macrodactylus subspinosus*). *a*, beetle; *b*, larva; *c* and *d*, mouth-parts of same; *e*, pupa; injury to leaves and blossoms with beetles, natural size, at work. (After Marlatt, U.S. Dept. Agriculture.)

and there in the counties bordering on Lake Erie, the insect was especially abundant. In the neighborhood of London it has been prevalent for some years, but does not seem to extend much to the northward of the region referred to. There are, however, isolated occurrences in other parts of the Province recorded, as an example of which may be mentioned a severe attack upon young corn in the County of Grey last year.

The following is an account of the insect furnished by the writer to the *Toronto Globe* in July last, which may be repeated here:—

This destructive insect is called the Rose-beetle, from its attacks upon the buds and full-blown flowers of roses, which it burrows into and devours, but it by no means confines its attention to this plant. It is especially in-

jurious to the blossoms of the grape, upon which it clusters in great numbers and soon destroys all possibility of fruit, and it attacks the blossoms of fruit trees, large and small, ornamental shrubs, flowers, and in fact almost any kind of vegetable growth. It appears in immense numbers, and covers the plants that are attacked with a sprawling mass of beetles, full of alarm to the careful gardener and anxious grower.

The beetle is pale brown or drab in color, about a quarter of an inch in length, and with very long, spiny legs. The early stages of the insect are passed underground in sandy meadow land, where as a grub it feeds upon the roots of grasses and other plants. The eggs are laid by the female beetles in the ground during June and July, and the grubs become full-grown before winter; in the spring they turn into the pupa (or chrysalis) state, and come out as winged beetles in June. For about five weeks in June and July they abound, and then suddenly disappear, having completed their life course, not to be seen again till the following summer. Happily there is only one brood in the year.

It is a remarkable fact that the ordinary insecticides have little or no effect upon this pest, and it will eat blossoms sprayed with Paris green and thrive upon them. Many experiments have been tried, and it is found that, where the work is to be done on a large scale the congregated insects may be repelled by a wash made by adding about three pecks of freshly-slaked lime to a quart of crude carbolic acid in fifty gallons of water. This does not kill the insects, but the smell of the carbolic drives them away.

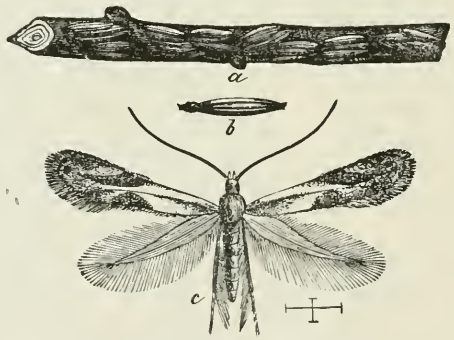

FIG. 15.—The Apple Bucculatrix. *a*, cocoons on twig; *b*, single cocoon; *c*, moth, greatly enlarged.

Another method is to spray the masses of beetles with half a pound of fish-oil soap in a gallon of water. It is claimed that this will kill about 95 per cent. of the insects. It acts by closing up their breathing apparatus and causing death by suffocation. On a small scale much may be done by beating the insects, in the early morning when they are sluggish, into pans containing a little coal oil and then burning them; or they may be knocked off into an open umbrella and then destroyed. Choice grapes or plants may be protected with netting.

It is now, however, almost too late to do much this season, as the destructive period of their lives is nearly over, but measures should be taken to prevent the recurrence of the pest next year. This can be done to a large extent by breaking up all the sandy meadows or old pastures in the neighborhood where the insects occur and putting in some crop instead. They do not breed in clay land, but in sandy soil, especially where it is damp from want of drainage. In this case, as in many others, the destructive insect has not much chance of appearing in injurious numbers if clean, scientific farming is carried out with a proper rotation of crops.

The large caterpillars of the Cecropia Emperor Moth were remarkably abundant this year on apple and crab trees at London, Brantford and Guelph. Being so large and voracious they consume the foliage very rapidly and soon strip a branch of its leaves. In Toronto Mr. Nash found it in considerable numbers on spiræa, as many as a dozen being seen on one bush in August. This handsome insect cannot be classed amongst our noxious species, as it rarely occurs in any numbers, being kept in check by its parasitic enemies; the cocoons in winter are also attacked by woodpeckers, who perforate the silken wrappings and suck out the liquid contents of the chrysalis.

Among other insects affecting the apple may be mentioned the Common Eye-spotted Bud-moth (*Tmetocera ocellana*) which we always have with us. The Apple Bucculatrix (*B. pomifoliella*)—fig. 15—mining the leaves, was

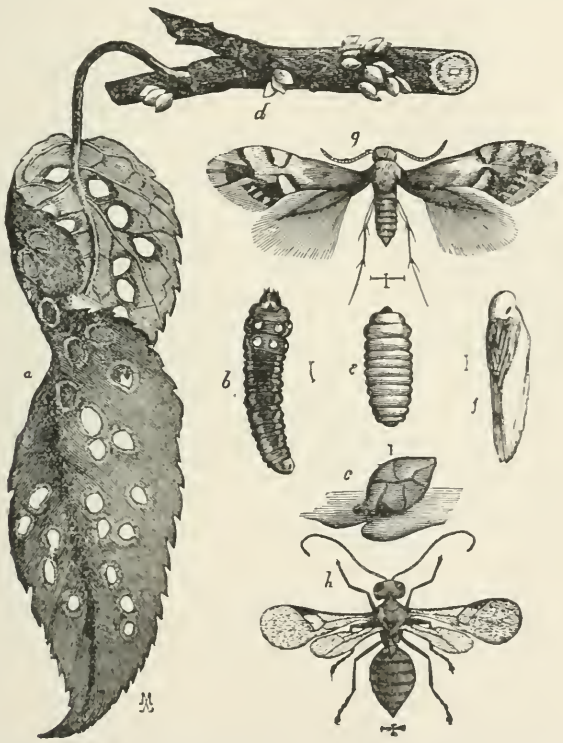

FIG. 16.—The Resplendent Shield-bearer. *a*, leaf showing holes made by insect; *b*, caterpillar; *c*, case; *d*, cases on twig; *f*, chrysalis; *g*, moth; *h*, parasitic fly.

abundant on some trees; its narrow, white cocoons were found in numbers on the twigs where the tiny caterpillars had attacked the foliage; at St. Catharines it occurred in injurious numbers.

An unusual attack upon the foliage of Quince trees was reported by Mr. Alister McKay, of Chatham. Large numbers of the leaves were found to be riddled with roundish holes in September, and in October the singular flat oval cases containing the chrysalids were to be seen in numbers attached to the leaves and to boards standing on end near the trees. The parent insect is a very beautiful minute moth called the Resplendent Shield-bearer (*Aspidisca splendoriferella*) which comes from the cocoons in May. The accompanying illustration (fig. 16) shows the insect in its various stages;

the moth is richly decorated with gold and silver streaks on its wings. The lime-sulphur treatment would no doubt clear the trees of these small cocoons and put an end to the attack.

Shade-tree Insects.

The Tussock Moth, which has been so often referred to and described in our Annual Reports, has continued its depredations on the shade trees of Toronto and some other places. It seems extraordinary that effective methods of control have not been adopted by those who have charge of the city parks and avenues. The remedy is simple, easy and effective and should not be very costly. It is only necessary to have the white egg-masses removed from the trees during the winter and destroyed by burning; this will get rid of the following season's crop of caterpillars. Trees once cleared, unless their boughs interlace wtih others that have not been attended to, will not be affected again for many years, as the female moths are wingless and they cannot travel any distance. Any cocoons that do not bear an egg-mass should not be interfered with as, if not empty, they contain either useful parasites or the chrysalids of the harmless males.

The Cottony Maple-scale (*Pulvinaria innumerabilis*) which has been excessively abundant on the shade trees in the streets of London for several years, and has also spread to vines and creepers, has at length begun to wane. During the past summer there was a very evident diminution in its numbers, so much so that it was hardly noticeable in some parts of the city and has ceased to excite alarm.

It is reasonable to expect, from past experience, that the insect will not be troublesome for some years to come, owing no doubt to the check it has received from useful parasites and unfavorable atmospheric conditions. At Guelph twigs were found this summer covered with the scales, but on examination it proved that not even one per cent. of them were alive; the rest were all dead and in many cases there was a hole in the scale through which the parasite had emerged. A similar condition was found in specimens sent from St. Mary's and Fergus.

The Black-banded Scale (*Eulecanium nigrofasciatum*, Perg.), called also the Terrapin Scale from its turtle-like shape, was found in great abundance on a maple tree near St. Catharines. Though not a common insect in Canada, it might easily become an injurious pest as it also attacks plum, peach, apple, linden, birch and several other trees. The affected tree was to be cut down and burnt in order to prevent any danger of the spread of the insect to the neighboring fruit orchards.

Another attack upon Maples of an interesting character was reported by Mr. Donald Fisher, of Vittoria, in September. The insect was the Maple-leaf Cutter (*Incurvaria acerifoliella*) which, in the caterpillar stage, cuts out round pieces of the leaves and forms with them a case in which it lives and hides. When in the case it feeds upon the leaf all round its dwelling and thus marks it with a series of blotches forming a circle on the surface of the leaf; when it has completed the circle in one place it moves to another on the same leaf and repeats the operation, till the leaf is covered more or less thickly with these round and conspicuous blotches. When the caterpillars are fully grown, the cases fall to the ground and the chrysalis stage is entered upon. There they remain all winter beneath the trees, and in the following May the tiny moths appear, pretty creatures with long, narrow pointed wings, the front pair steel-blue and the hinder ones smoky brown with a purplish reflection: on top of the head there is a tuft of bright orange hairs. These insects are sometimes numerous enough to completely defoliate

the maple trees they attack; but they are rarely to be found in numbers two years running, and as they work late in summer they do not injure the trees very much, the leaves having by that time nearly completed the discharge of their functions. If found to be necessary, a simple remedy would be to rake up the leaves, including the cases, under the trees and burn them on the spot. Dr. Fletcher, in his Report for 1885, records an attack by this insect on maple trees in the neighborhood of Ottawa, and also relates a similar visitation in Missisquoi County, P. Que., described by the Rev. Dr. Fyles in the year 1881.

The Spruce Gall-louse (*Chermes abietis*) Fig. 17, has become a serious enemy to spruce trees and is causing much trouble and anxiety to the growers of these ornamental trees in many parts of the Province. It is very abundant at Guelph, Galt, Minden, Chatham and various other places. As it has frequently been described and referred to in these Annual Reports, it

Fig. 17.—Spruce Gall-louse. *a*, summer form of nymph; *b*, affected twig.

may suffice to mention now that good results have been obtained by spraying affected trees at the time the young plant-lice are exposed with a tobacco and soap wash or with kerosene emulsion. This should be done in May when the young lice emerge from the eggs and before they are enclosed in the galls, and also towards the end of August when the winged forms come out of the galls. The terminal shoots should be watched at those times and the spraying performed as soon as any of the insects are to be seen moving about. They are so minute that a magnifying glass will be required to see them. The spraying should be repeated two or three times at short intervals, as the insects do not all come out at the same time.

The Larch Saw-fly (*Nematus Erichsonii*) is still to be found here in a small plantation on the College premises. Towards the end of July full-grown larvae were found, which assumed the chrysalis stage a few days after they were collected (July 23). There had evidently been a serious attack in the spring, as nearly all the boughs had a very short and scanty clothing of light green foliage, contrasting strongly with the deeper hued and much longer needles on the branches that had not been defoliated. The ground

beneath the trees was covered with the old droppings from the caterpillars. This plantation has been repeatedly sprayed in previous years, but the insect is very far from being exterminated. Its ravages in the Province of Quebec are graphically described by Dr. Fyles in another part of this Report.

Spittle insects (*Aphrophora*) were abundant this summer on some Scotch Firs and also upon grass in pasture fields—no doubt different species. The masses of white froth, resembling spittle, were very conspicuous, each one containing the strange larva which produces it. The adult bugs were to be found in numbers on the Fir trees later in the summer. No serious damage was done in either case, though no doubt an extensive attack must reduce the vitality of a tree, and in a pasture the presence of the frothy masses would be very distasteful to the feeding cattle.

The Fall Web-worm was very abundant again this year. It is so conspicuous and so easily got rid of, a whole colony at a time, that there is surely no excuse for its increase and prevalence. The very unsightliness of the webs, with their foul masses of excrement and cast-off caterpillar skins, ought to be enough to cause every one with a spark of tidiness in his composition to clear at least his own trees and induce his neighbors to follow his example.

INSECT GALLS OF ONTARIO.*

By Tennyson D. Jarvis, Ontario Agricultural College, Guelph

I am under obligations to numerous friends and correspondents who have aided me in this work. I am especially indebted to Mr. W. R. Thompson, O. A. College, for the assistance he has rendered in the preparation of this work. I am under obligations to the Department of Entomology, Washington, D.C., Dr. Bethune, Dr. Fletcher, Prof. Lochhead, Mr. J. Eaton Howitt, Mr. C. W. Nash and Mr. Douglas Weir for the assistance they have given me.

Among the many curious phases of insect life, and among the many wonderful illustrations of the effects of evolution upon organized structures with which we meet in the study of entomology, there are few examples which present such varied and interesting peculiarities of structure and development as do insect galls. Varying as they do from such simple malformations as the curled leaves produced by the work of aphids to such beautiful and complex structures as the oak-apples and oak twig-galls, they present a succession of types which show in a peculiar and wonderful manner the changes in structure of insect and plant induced in the struggle for existence. A gall may be briefly defined as a malformation of plant tissue induced by mechanical or chemical stimulus or by some other unknown cause. These are sometimes produced by fungus, but those with which we have to deal are produced in different ways by the work of insects. The habit of gall-making seems to have arisen at different times and in entirely different orders and families of insects, and even a branch of the order Acarina has acquired this gall-making habit. In each case, however, it has developed along lines which depend directly upon the structure of the insect, so that in many cases the classification of the insect can be considerably simplified by an examination of the gall. For instance, the Cecidomyiid, having an ovipositor incapable of piercing, lays its eggs upon the surface of the leaf,

*See plates at beginning of volume.

and the gall thus induced by the work of the larva is generally open; while the Cynipid, having a stinging ovipositor, deposits its eggs in the leaf tissue through a minute puncture, which, quickly healing, leaves the gall closed and the insect at maturity emerges through a hole which it cuts in the gall, which the Cecidomyiid, on account of its sucking mouth parts, is utterly unable to do. Here, moreover, we have an explanation of the apparently contradictory fact that Cecidomyiid galls are sometimes closed, because whenever we find this condition we invariably find the gall splitting open at maturity. The reason for this in all probability is that the larva entering the tissues makes a much larger incision than the minute puncture induced by a Cynipid's ovipositor, and this, never completely healing, splits open when the tissues commence to dry up in autumn. Similarly in other orders the structure of the gall-maker determines the form of the gall.

These abnormal growths have long been noticed and commented upon. The earliest authentic work upon the subject was by Malphigi. In 1686 he published his "De Gallis," containing descriptions of a number of galls common to Italy and Sicily. In America the subject was first taken up by Osten Sacken, Walsh, Basset, Riley, Harris, and a few others who have laid the foundations for most of our work on galls. Now a large number of writers, among whom may be mentioned Ashmead in Hymenoptera, Pergande in Hemiptera, Garman in Phytoptidae and Norton in Nematinae. A host of European writers have also taken up the subject, but in this country there still remains an enormous amount of work to be done even in classification, while the morphology and histology is practically an unexplored territory.

The insects producing galls are confined principally to four orders, the Acarina, which are not true insects but mites, the Diptera or flies, the Hemiptera or bugs, and the Hymenoptera including two families, the Tenthredinidae and Cynipidae, and to a slight extent the Chalcididae. It is a curious fact that the insects which are of the most developed and specialized structure, produce the most complex galls. That is, in the lower orders, as Thysanura, the orders formerly included in Neuroptera, Orthoptera, and other orders, we find no gall-making habits; while in the Diptera, Hemiptera and Hymenoptera, and to a slight extent in the Lepidoptera and Coleoptera we find the habit developed. This curious coincidence may be possibly explained thus—if, indeed, the lower and less specialized forms which came into existence in an earlier age when a lower and now extinct type of vegetation flourished, ever produced forms with the habit of gall-making, these forms probably perished with the flora of that age, while the later forms which now produce galls were evolved at a much later period when the flora resembled that of the present age.

The orders of insects among which we find the greatest number of gall-producing insects are the Hemiptera, Diptera and Hymenoptera, and to some extent the Coleoptera and the Lepidoptera. The order Acarina in the class Arachnida contains the family Eriophyidae or gall-mites. These are also specialized forms, inasmuch as acaralogists seem to be unable to agree upon their relationship to other Acarina.

Acarina.

Family Eriophyidae, Gall-Mites.

This is a family of microscopic mites which are quite curious and unusual in structure. They have only two pairs of legs and the abdomen is long and striated. These striations, which differ in the different species, and differ in number on the dorsal and ventral surfaces, are of considerable

value in classification. The galls produced vary in form, but are always open or provided with an opening through which the mites pass in and out. They are generally lined with minute hairs or granules, and are quite simple in structure. Reproduction takes place within the gall.

Coleoptera.

Family, Buprestidae. Metallic Wood Borers.

This is a family of the beetles containing insects whose larva bore in wood of trees and shrubs. A few produce galls, the most important one being the Red-necked Agrilus producing galls upon the Raspberry and Blackberry canes.

Lepidoptera.

Super-family, Tineidae. Leaf miners and clothes moths.

This family is very large and the larvae are mostly plant feeders. The adults are minute moths with narrow wings bordered with wide fringes. The family contains but few gall-makers.

Hemiptera.

Family, Aphididae. Aphids or plant lice.

These are small, soft bodied insects which suck up the juices of plants and which often produce galls. There are winged and wingless forms, the wingless forms reproducing parthenogenetically. The galls produced vary in form from mere leaf curls to forms of most curious appearance but of quite simple structure. They are all open or furnished with an opening, and large numbers of the aphids can be found if the gall is opened.

Family Psyllidae. Jumping plant lice.

The members of this family resemble the preceding to a great extent, but they are not so numerous. The hind legs are formed for jumping.

Diptera.

Family, Cecidomyiidae. Gall gnats.

These insects in the adult stage are rarely seen. They are very delicate, small, two-winged flies and with few veins in the wings and with sucking mouth parts. The eggs are laid upon the leaf surface and the larva either feeds there, making an open gall, or makes an incision in the leaf and enters, forming a closed gall, which splits open at maturity at the point where the larva entered. The larvæ can generally be readily identified by their color, which is orange, red or pink, and by the development between the second and third segments of the body of a peculiar horny projection called the breast-plate, the use of which is not definitely known.

Sub-family, Trypetinae.

These flies are much larger than the preceding, but few of them produce galls. Two species, Trypeta polita and Trypeta solidaginis, produce galls upon the goldenrod. The adults are pretty flies with banded wings.

Hymenoptera.

Family, Tenthredinidae.

In this family the Nematinae produce galls. The head and thorax are wide. The base of the abdomen is broadly joined to the thorax, and the abdomen of the females is furnished with a pair of saws. The larvae have from twelve to sixteen prolegs. These insects have been very thoroughly taken up by Norton in his monograph on Nematinae. A large number make galls on Willows.

Family, Cynipidae. Gall flies.

This is a family of very minute, four-winged insects. In the adult gall fly the abdomen is unusually compressed and joined to the thorax by a short peduncle, the first abdominal segment. The first segment is large and the remaining ones are short and each is more or less covered by the preceding. The ovipositor is long and slender. The insect deposits its eggs within the tissues of the plant by piercing it with its ovipositor. The wings have few veins and the fore-wings lack the stigma. The galls produced are closed and the insect emerges at maturity through a hole which it cuts in the gall. One of the most interesting features of insect life that has been discovered was noticed by Bassett and confirmed by Adler in regard to these insects. By careful investigation he discovered that two generations of these insects were produced every year, each of which produced a different sort of gall, and which could not be recognized as the same species. There is still, however, an enormous amount of work to be done upon this subject in America.

ERIOPHYIDAE.

Eriophyes quadripes. Produces top-shaped galls on the upper surface of the leaves of soft Maple. The galls are greenish at first, then become red, or purplish and finally dark brown. In the younger galls the inside wall is fairly smooth and the interior is hollow. As the galls grow older, irregular and somewhat granular excrescences appear on the interior wall and grow toward the centre until in the older specimens the interior may become quite full. It occurs on Soft Maple (*Acer dasycarpum*). Very common.

Eriophyes acericola. The mature galls are green and resemble in form and position the summer cases of the cigar-case-bearer. The interior wall is granular and parallel excrescences are found, but even at maturity they do not extend to the centre of the interior as in the case of E. quadripes. Occurs on Hard Maple (*Acer saccharum*). Very common.

Eriophyes abnormis. Produces balloon-shaped galls on the upper surface of the leaf. The apex of the gall is usually serrated. The interior has ridges projecting inward and the folds in the old galls nearly fill the cavity. Occurs on Basswood (*Tilia Americana*). Very common.

Eriophyes ulmi. The galls are intermediate in form between those of the Hard and Soft Maples and somewhat balloon-shaped. The interior wall is ridged vertically. The galls usually occur on the upper side of the leaves. Occurs on Soft Elm (*Ulmus Americana*) and Rock Elm (*Ulmus Racemosa*). Very common.

Eriophyes sp. Produces irregular wart-like swellings on the upper surface of the leaves of the Manitoba Maple. The swellings are green at first but turn gray when mature. The average diameter of the gall is about 3 m.m. The under surface of the galls appears as irregular concavities lined with a granular secretion, which is greenish at first and rusty brown when old. Occurs on Manitoba Maple (*Acer negundo*). Common.

Eriophyes phloeoptes. Produce tubercular gall masses which encircle the base of the buds and shoots of the cultivated plum. The galls are about one-sixteenth of an inch in diameter, and the interior is granular with a small cavity in the centre. As many as sixty-two of these mites were found in a single gall. Occurs on cultivated Plum (*Prunus domestica*). Not common.

Eriophyes sp. This species produces an abnormal growth of the buds of the Yellow Birch. The terminal growth of the twig is checked and large bunches of buds are formed sometimes as large as a hen's egg. The galls remain on the tree, giving the tree an unsightly appearance in winter. Occurs on Yellow Birch (*Betula lutea.*) Common.

Eriophyes pyri. Produces blister-like swellings on the leaves of the Pear and Apple. The blisters are reddish brown in May, green in June, and dark brown or black in the latter part of June. The blisters usually run together, forming irregular blotches over the upper surface of the leaf. Occurs on Pear (*Pyrus communis*) and Apple (*Pyrus malus*). Very common.

Eriophyes sp. This gall is green and red and about 2 c.m. in length. It consists of a fold of the leaf making a long, irregular, wavy projection on the upper surface of the leaf. From beneath this appears as a serpentine incision in the leaf. It is about 2 m.m. high. It is hard and roughened on top. From the midrib to the edge of the leaf is the general direction of the gall. Occurs on Hawthorn (*Crataegus sp.*). Common.

Eriophyes sp. Produces galls about 2.5 m.m. in length by 1.5 m.m. broad. It is joined to the leaf by a constriction. Externally it is red and pubescent. Inside gall is full of granular material and contains numerous mites. Occurs on Speckled Alder (*Alnus incana*). Common, especially upon the leaves of the bushes at the water's edge.

Eriophyes sp. This mite produces galls of the typical Eriophyid shape upon the leaves of the Paper Birch. The galls are yellowish or reddish, joined to the leaf by a constricted neck and rather smaller than usual, being about 2 m.m. long by 1 m.m. broad. They appear on both upper and under sides of the leaf, and when found upon the under side, hairy. The opening on the opposite side through the leaf lined with white hairs.

Parasitic mites attack this species and often they are found to have devoured or driven out all of the gall makers. Occurs on the Paper Birch (*Betula papyrifera*). Common.

Eriophyes salicola Garman. The gall is irregular, roundish and serrated, with a roughened top, projects about 1.5 m.m. from the surface of the leaf, slightly constricted where it joins the leaf. From 1-4 m.m. in diameter. On the under side there is sometimes a small projection and sometimes a cup-like cavity in which are seen the roughened portions of the under side of the gall. When the gall is mature, it is filled with granular excrescences and hairs growing from the interior walls. The gall is green or red and distributed over the upper or lower surface of the leaf. Occurs on *Salix Alba, Salix balsamifera, Salix discolor, Salix rostrata.*

The description was taken from Galls on Salix balsamifera.

Eriophyes sp. This mite produces dimples on the leaves of the Aspen on the upper side lined with spherical granules, reddish or greenish in color. These consist of soft parenchymatous tissue upon which the mites feed. The galls are fairly uniform in size, being about 2 to 3 m.m. in diameter. The galls are green in color and occur three or four to a leaf. Occurs on Aspen (*Populus tremuloides*). Common.

Eriophyes sp. The galls consist of irregular projections on the upper or under side of the leaf and are quite generally distributed in patches, 4-5 m.m. in length or even 1.5 c.m. They project about 1-1.5 m.m. above the leaf. On the under side they appear as irregular cavities lined with white vegetable hairs. The galls are green in spring, turning red later in the season. Occurs on Poison Ivy (*Rhus toxicodendron*). Common.

Eriophyes sp. This gall consists of a small circular depression averaging about 2 m.m. in diameter and always depressed on the lower side of the leaf. On the upper side it appears as a green or red circular elevation. The gall is lined with minute spherical granules composed of soft parenchymatous tissue. Occurs on large-toothed Aspen (*Populus grandidentata*). Common.

Eriophyes sp. This gall is so different in structure from the typical Eriophyes fraxini gall that I have no hesitation in placing it as a different species. The galls are produced almost invariably along the principal veins. Dorsally they are light pinkish white in color, about 2.5 by .75 m.m. and growing on either side of the vein. The surface of the gall is transversely seamed and irregular. It lies in a one-sided position upon the leaf. Ventrally the galls appear as white, hairy projections following the veins. The opening runs the full length of the gall and is lined with white, hairy tissue. The mites are exceedingly numerous, more occurring to a gall than of any other species. They can easily be detected with a hand lens and are brown in color. The interior of the gall is lined with soft tissue. Occurs on White Ash (*Fraxinus Americana*). Not common.

Eriophyes sp. This gall is a pouch-like growth on the upper side of the leaf. It is distinguished from *E. serotinae* by the fact that it has not the funnel-like opening of that gall. It is green or reddish, about .5-.7 cm. in length and 3 m.m. in diameter at its widest part. Near the leaf it is constricted to about 2 m.m. in diameter. The interior of the gall is lined with small granules and among these the gall mites feed. The gall opens on the under side by a minute aperture about 1 m.m. in diameter lined with fine white hairs. Occurs on Chokecherry (*Prunus virginiana*). Common.

Eriophyes sp. Only one specimen of this gall was found. It is of the same type as the gall on Chokecherry, but rather longer and narrower. It is green in color and the inside is lined with rough juicy tissue. Only two mites were found in the gall, near the opening. Occurs on Wild Plum (*Prunus Americana*). Not common.

Eriophyes querci. This is an irregular dimple upon the blade of the leaf. It is of the same color as the leaf when young, but turns yellowish red with age. From beneath it appears as an irregular concavity, lined with a tangled mass of white vegetable hairs. Among these abnormal hairs are the mites, which feed upon the tissue and produce the gall. The gall is 3 to 5 m.m. in diameter. Occurs on Bur Oak (*Quercus macrocarpa*). Common.

Eriophyes serotinae. This gall is pouch-like. It occurs upon the upper side of the leaf with a deep funnel-like opening beneath. The gall is about .5-.6 cm. in length and consists of a pouch-like hollow growth on the upper side of the leaf constricted about half way to the leaf. The interior of the gall, which is green or red and green, is covered with minute granulations, which seem to be the food of the mites producing the gall. The distinguishing character of the gall is the deep funnel-like opening beneath lined with hair through which the mites pass in and out. Occurs on Black Cherry (*Prunus serotina*). Common.

Eriophyes sp. The gall made by this species of Eriophyes consists of a small round swelling which protrudes very slightly on both sides of the leaf. This is about .5-1 m.m. in diameter, green in color in spring, and turning brown in summer and autumn. The galls are very numerous where they occur, and as many as 100 are sometimes found on a single leaf. The gall contains numerous mites, which feed in the irregular cavities in the gall. Occurs on the spotted Hawthorn (*Crataegus punctata*). Not common.

Eriophyes sp. Red patches are found upon the upper sides of the leaves of Maples, resembling hoar-frost. Under the microscope, it is seen to consist of minute pink balls, joined to the leaf by a constricted neck and occurring in such numbers as to appear like red frost. Occurs on Hard Maple (*Acer saccharum*). Common.

Eriophyes sp. It differs from the frost mites on Hard Maple and Beech in that it does not consist of a mass of spherical granules, but of a mass of tangled threads which under the lens are seen to be arranged in very beautiful star-like clusters. The mites are easily found among these. The patches are found on the under side of the leaves betwen the ribs. Occurs on Rock Elm (*Ulmus racemosa*). Common

Eriophyes sp. The structure of this frost mite gall is much the same as that of the red frost mite, but the mass of excrescences is thicker, white in color and produced upon the under side of the leaf. Occurs on Hard Maple (*Acer saccharum*). Common.

Eriophyes sp. The gall consists of a mass of tangled white vegetable hairs. The growth is very much the same in general appearance as the one producing the "frost" and "down" on Rock Elm and Beech. The mites are quite small and difficult to locate, as they are much the same in color as their surroundings, and remain down in the lower part of the gall near the leaf. The gall is found on the lower side of the leaf, a common place is in the axils of the veins. Occurs on Mountain Maple (*Acer spicatum*). Common.

Eriophyes sp. The work of this mite is very commonly seen. It appears upon the leaves of Beech quite early in the season. The presence of the mite is shown by large irregular white masses on the under surface of the leaves which have a glittering appearance resembling hoar frost. Under a microscope, this appears as a mass of innumerable, minute, spherical granules. Among these are the mites, which are few and very difficult to locate. The upper surface of the leaves upon which the frost mite is working are discolored and in some cases distorted. Occurs on Beech (*Fagus sylvatica*). Very common.

Eriophyes sp. This consists of a mass of minute, yellowish, transparent, granular bodies upon the leaf, growing together in such numbers as to form large patches of frost running between the ribs, which hide the leaf. The patches vary from 1 cm.-3 cm. in length and from .25-1cm. in diameter. Among these granules are the mites which are extremely minute, the smallest of all the mites yet examined. Occurs on Paper Birch (*Betula papyrifera*). Common.

Eriophyes vitis. These are typical Eriophyid galls about .5 cm. in length by 2.5 m.m. at the widest portion to 1 m.m. at the constricted portion near the leaf. The top of the gall is irregular, being much in appearance like *Eriophyes abnormis*. The interior and the entrance to the gall is lined with white vegetable hair. The galls are green in color and grow mostly upon the under sides of the leaves, with the opening upon the upper side. Occurs on Wild Grape (*Vitis cordifolia*). Not common.

Eriophyes fraxini. The galls produced by this species of mite are found upon several species of Ash, and vary somewhat in structure according to the leaf upon which they are found, upon Red Ash being hairy, upon White Ash glabrous, etc. They consist of somewhat irregular circular swellings from 2-4 m.m. in diameter which protrude upon both sides of the leaf. Sometimes they occur only 10 to a leaf, but sometimes as many as 75 are found, entirely covering the surface of the leaf and so interfering with its functions as to injure the tree upon which the galls occur. The surface of the galls is rough. Several often unite, to form a large irregular patch. On the under side are the minute, hairy-lined openings into the galls. The galls are hollow, thick-walled, and lined with numerous granular excrescenses and irregular growths. The gall is of a lighter green than the rest of the leaf. Occurs upon White Ash (*Fraxinus americana*) and Red Ash (*Fraxinus pubescens*). Common.

Eriophyes sp. This is one of the "frosts" produced by the work of the mite upon the leaves. The patches of frost are pure white in color, and occur on the under side of the leaves, in the axils of the veins. Under the microscope, these patches of "frost" appear as dense masses of thick transparently white hairs. The patches vary in size from 4-10 m.m. On the leaves of *Alnus incana.* Not common.

Eriophyes sp. This consists of a dense mat of brown hairs growing in large patches upon the under sides of the leaves. Above, the leaf appears lighter in color and rather abnormally shiny where the gall mites are working beneath. On *Quercus coccinea.* Common.

Eriophyes sp. Circular, flat, or slightly convex patches varying from 2-3 m.m. in diameter on the upper side of the leaf, the under side being covered with minute granular excrescences, which vary from white to dark brown in color. On *Populus grandidentata.* Common.

Eriophyes sp. Irregular patches of frost, transparently white in color and appearing as a mass of minute granules. Under the microscope similar to the frost upon the Beech and Maple. Occurring upon the surface of the leaves. Occurring upon the leaves of the Low Birch (*Betula pumila*). Uncommon.

Eriophyes sp. Similar to the above but rosy pink in color, and occurring in much larger patches, upon the upper side of the leaves. On *Betula lenta.* Common.

Eriophyes sp. These galls are produced upon the Soft Elm, and when young bear some resemblance to the typical mite gall of the Elm (*Eriophyes ulmi*), but the distinguishing peculiarity of these galls is that they grow until they reach a size far exceeding that of any *E. ulmi* yet observed, sometimes attaining a length of 2 by 1.5 cm. The development of the galls also differs from that of *E. ulmi*, which commences as a button with a constricted neck, while this gall often commences as a cone, or deep dimple. On Red Elm (*Ulmus pubescens*). Not common.

Hemiptera.

Spruce Gall-louse (Chermes abietis).

These galls are greenish swellings, occurring on the twigs of various species of Spruce and sometimes in immense numbers. The galls are polythalamous, containing from three to thirty cavities within each of which live twenty or thirty minute yellowish insects. In July the galls dry up, and the cavities open, allowing the lice to escape. These molt and some of them assume wings. This gall-louse is one of the worst pests of Spruce trees known. In many parts of Ontario nearly every tree is abundantly covered with this gall, and the insects do great damage by sucking the juices of the tree. Occurs on White, Black and Norway Spruce—*Picea alba, Picea nigra and Picea excelsa.* Very common.

Vagabond Gall (Pemphigus vagabundus).

Produces large irregular galls on the tips of the twigs. It is a monothalamous gall consisting of a double lamina, and between these two layers are large numbers of aphids. The gall usually remains on the tree over winter. Occurs on the Cottonwood (*Populus deltoides*). Common.

Cockscomb Gall on Elm (Colopha ulmicola Fitch).

A hollow, cockscomb, thin-walled gall on the leaf of the American Elm. Occurs on the upper side of the leaf. The apex of the gall is serrated and the sides grooved. The gall appears inflated. The opening is on the under side of the leaf, running the full length of the gall. The in-

terior contains numerous aphids in July and June. The gall is 1.5-2 cm. long by 1 cm. high. Occasionally a number occur on a leaf side by side. It is constricted near the base. Occurs on American Elm (*Ulmus Americana*). Common.

Spiny Witch-Hazel Gall (Hormaphis spinosus).

This gall is round, covered with long spines. It is a deformation of the fruit bud. The spines are covered with little clusters of hair like those on a cactus leaf. In it are many small aphids, brown in color. The opening to the gall is at the base, near the stem of the gall by which it is joined to the branch. Green in summer, woody and hard in winter. Occurs on Witch-Hazel (*Hamamelis virginiana*). Common.

Witch-Hazel Cone Gall (Hormaphis hamamelidis).

This gall is cone-shaped, about 5 m.m. in length by 3 m.m. in diameter. It occurs on the upper side of the leaves, with the opening through a small hole in a slightly projecting cone on the under side of the leaf. The opening is about 5 m.m. in diameter. The gall is hollow, containing numerous aphids which are white in color. Occurs on Witch-hazel (*Hamamelis virginiana*). Common.

Poplar Stem Gall (Pemphigus populicaulis).

An irregularly spherical gall developed at the junction of the petiole and blade of leaf. The opening is as wide as the gall and is at one side of the base of the pouch. It is hollow, about 11 m.m. in diameter, containing large numbers of aphids. Occurs on Cottonwood (*Populus deltoides*). Common.

Hickory Cone Gall (Phylloxera Caryae-fallax).

This is a cone-shaped gall about 3 m.m. in diameter which occurs rather uncommonly on Hickory in this district. The gall is on the upper surface of the leaf, the opening being in a smaller cone upon the under surface. The gall is monothalamous, and contains numbers of small white aphids. It is green in color, and the opening is fringed with hairs. Occurs on Shell-Bark Hickory (*Carya alba*). Not common.

Vein Gall on Hickory (Phylloxera caryaevenae).

This gall consists of a fold of the main veins running from the midrib to the edge of the leaf. Above it is ribbed by the vein running along it. It is 5 m.m.-1 c.m. in length and 1-1.75 m.m. wide and 1.5-3 m.m. high. The galls are red. From the ventral side they appear as slits along the vein, lined with white thick hair. The gall is hollow and contains eggs, small aphids and a stem mother. The eggs are oval and transparently white and the gall is grooved inside, evidently for the purpose of holding them. The galls begin to appear in May, and are mostly empty by August. The larvae, according to Pergande, conceal themselves in cavities of the bark, or in deep depressions in the trunk and stem after leaving the gall, where they feed upon the juices of the tree. Occurs on Shell-Bark Hickory (*Carya alba*). Not common.

Cottonwood Midrib Gall (Pemphigus sp.)

A somewhat elongated pouch-like gall of aphid origin growing on the midrib of the leaf of the cottonwood, about halfway between the base and the apex of the leaf, and never on the leaf at the junction of the petiole and blade like *P. populicaulis*. Also instead of being irregular globular as is the latter, this gall is pouch-shaped, about 1-1.5 c.m. broad. Occurs on Cottonwood (*Populus deltoides*). Common.

Hackaberry Nipple Gall (Pachypsylla celtidis-mammae).

A woody gall with bluntly rounded apex and slightly constricted at the point of attachment to the leaf. It is found on the underside of the leaf and opposite the gall is a concave depression. Occurs on Hackberry (*Celtis occidentalis*). Common.

Hackberry Blister Gall (Pachypsylla celtidis-vesiculum).

Circular spot-like galls on the under side of the leaf with a small nipple in the middle. Occurs on Hackberry (*Celtis occidentalis*). Common.

Sumac Tomato Gall (Pemphigus rhois).

Large, smooth, rounded galls, somewhat resembling a tomato in shape. Yellowish green in color and sometimes tinged with red. The interior is hollow and filled with lice. Occurs on Sumac (*Rhus typhina*). Common.

Woolly Aphis Gall of Elm.

The lice may be seen in large clusters on the trunk and branches of the tree. They suck the juices from the bark and cause knot-like swellings to appear. These galls sometimes attain a diameter of two or three inches. Occurs on many species of Elm (*Ulmus sp.*). The one from which this gall was described was a young American Elm (*Ulmus Americana*). Common.

Woolly Aphis of Apple.

This species of woolly aphis live in small colonies and produce small swellings on the young twigs. The galls often become twice the diameter of the stem upon which they are feeding. Occurs on Apple (*Pyrus malus*). Common.

Grape Phylloxera (Phylloxera vastatrix).

Small galls on either upper or lower surface of the leaf. Another generation of this insect forms galls upon the roots, and it is in this stage that it causes considerable destruction among the cultivated varieties. Occurs on wild and cultivated Grapes. Very common on Wild Grape (*Vitis vulpina*).

LEPIDOPTERA.

Elliptical Goldenrod Gall (Gelechia gallaesolidaginis).

A large elongated stem gall. It is about one inch in length and monothalamous. The larval chamber is quite large. It remains over winter in the pupal stage and the imago emerges in the spring. Occurs on Goldenrod (*Solidago sp.*). Common.

The Locust-Twig Borer (Ecdytolopha insiticiana).

Oval swellings on the branches and twigs, varying from 2-4 cm. in length and about a cm. in thickness. Generally occurring at the junction of the leaf petiole with the branch, about which point the wood is destroyed and a mass of castings and sawdust surrounds the hole entering the gall. The tunnel of the gall maker runs some distance, and at the bottom of it is a reddish-brown larva about half an inch in length with a light-brown head.

COLEOPTERA.

Willow Branch Gall (Saperda concolor).

Large, rough galls on the stems of the willow and cottonwood. The galls are smooth at first, but become rough later in the season. The affected portions are very weak and easily broken off by the wind. Occurs on Willows and Cottonwood. Common.

Red-necked Blackberry-borer (Agrilus ruficollis).

Symmetrical swellings of the Blackberry cane. The gall is about one-third greater in diameter than the normal cane. The larva makes a channel in the centre of the gall. Occurs on Blackberry. Not common.

DIPTERA.

Vein Gall of Blue Beech (Cecidomyia pudibunda).

This gall consists of a fold of the leaf along the veins. It is not very much thickened and is generally constricted near the leaf, forming a long, hollow tube. The opening to the gall is on the underside and runs the full length of the gall. It is lined with white pubescence in much the same way as the Phylloxera on Hickory. Inside the gall, which is hollow, are found a few very small orange-colored larvæ. The gall is quite red in color. Occurs on Blue Beech (*Carpinus Caroliniana*). Common.

Ball Gall on Wood Nettle (Cecidomyia urnicola).

This gall is somewhat similar in structure to the gall on the fruit of the wood nettle, but is much smaller, much lighter in color and uniformly monothalamous, whereas the gall on the fruit is sometimes polythalamous. The larvæ are also somewhat smaller than those on the fruit. The galls occur either on the upper or lower surface of the leaf. Numerous small inquiline Hymenoptera were hatched from this gall. There is no opening in the gall. Occurs on Wood Nettle (*Laportea Canadensis*). Common.

Pine Cone Willow Gall (Cecidomyia strobiloides).

A mass of closely imbricated leaves at the end of a twig, caused by the arrest of growth at the end of the stem. Regularly cone-shaped. In the centre, surrounded by a thin, transparent covering, is a small orange larva. Occurs on Salix discolor and many other species of scrub willows. Common.

Oak Fold Gall (Cecidomyia niveipila).

Consists of a dense white pubescence upon the under side of the leaves, causing a distortion and folding of the leaf blade. The pubescence is inside the fold, forming the lining of the gall. Occurs on Red Oak (*Quercus rubra*). Common.

Wild Cherry Bud Gall (Cecidomyia serotinae).

A club-shaped, monothalamous gall with one or two leaves growing from its sides. The gall is an enlargement of the terminal buds of young shoots of the Wild Cherry. Occurs on Black Cherry (*Prunus serotina*) and Choke-cherry (*Prunus virginiana*). Common.

Eye Spot Gall of Maple (Cecidomyia ocellata).

This is a dimple gall surrounded by an areola. At first the gall is entirely green, but at maturity the nipple turns a rich red; the areola surrounding it becomes light yellow in color and a thin line surrounding this turns deep pink in color. The successive rings of color very much resemble a target. In the cavity formed by the underside of the gall rests a small white larva, covered with a viscid secretion. Later in the season the gall turns black and drops out, leaving a circular hole.

This gall has been usually placed as Sciara ocellata, but most authorities, including Osten Sacken himself, now place it as Cecidomyia, attributing the presence of the Sciara to an error in the rearing. Occurs on Red Maple (*Acer rubrum*) and Soft Maple (*Acer dasycarpum*). Common.

Grape Vine Tube Gall (Cecidomyia viticola).

A long conical, cylindrical tube-shaped gall, about .7-1 cm. in length by 1.5-2 m.m in diameter near the base, where it is attached to the leaf by a slight constriction. It tapers to a point at the tip. Monothalamous, containing several minute larvæ. It is green or bright red in color and occurs on the under side of the leaf. Occurs on Wild Grape (*Vitis sp.*). Not common.

Basswood Wart Gall (Cecidomyia verrucicola).

Small swellings on leaf of basswood, appearing in May or June. About 3 m.m. in diameter, protruding from both sides of the leaf about 1 1-2 m.m. The upper side has a dimple in the centre. Red above and green below. Open in the fall by means of a circular lid upon the underside. Contains small larvæ. Occurs on Basswood (*Tilia Americana*). Very common.

Burr Gall on Hawthorn (Cecidomyia bedeguar).

This is a small cylindrical gall, hollow, red or green in color, about 3 m.m. in height and diameter, and with a hole in the top of it. The top of the gall around the hole is thickly set with spines, making the gall look somewhat like a burr. Inside it are found many small orange-colored larvæ about 1.5 m.m. long. It is monothalamous and occurs on the upper side of the leaf. Occurs on Hawthorn (*Crataegus sp.*). Common.

Cherry Pocket Gall (Cecidomyia virginiana).

This gall consists of a malformation of the fruit. The pit or stone is absent and the fruit is enlarged, forming a thick-walled pouch about 1 cm. in length by 5 m.m. in width by 1.5 m.m. in thickness. The gall contains from 10 to 15 larvæ. It has no opening, but later the fruit becomes loosened from the peduncle and leaves an opening. The larvæ leave the gall in June or July. Occurs on *Prunus virginiana*. Very common.

Ash Midrib Gall (Cecidomyia pellex).

This gall is caused by a swelling and folding of the midrib of the leaflets, the thickening being greatest at the midrib and extending towards the edges of the leaf, often involving nearly the whole of it. The thickened portion is folded together, giving the leaflet the appearance of a bean or pea pod. A small cavity is left at the bottom of the gall which runs the whole length. In this cavity are found minute larvæ, feeding on the green succulent tissue of which the gall is composed. The underside of the leaf is always the outside of the gall. Occurs upon the leaflets of White Ash (*Fraxinus Americana*). Not common.

Box Elder Midrib Gall (Cecidomyia negundinis).

Swellings on the midrib of the leaflets of the Box Elder, much resembling *Cecidomyia pellex* on the White Ash. The swellings form two long circular chambers, one on either side of the midrib, opening on the upper surface by slits running the whole length of the gall. Occurs on Box Elder (*Acer negundo*). Not common.

Ball Gall on Hickory (Diplosis caryæ).

Thin-walled galls, about 3 m.m. in diameter, hard and brittle, attached to the underside of the leaves of *Carya alba* by a projection at the base, which appears upon the upper side as a black dot, surrounded by a light yellow areola. The gall has no opening and contains a very small larva. The hypertrophy is monothalamous. The exterior of the gall is smooth or slightly pubescent. Occurs on *Carya alba*. Common.

Tulip Tree Midrib Gall (*Cecidomyia tulipifera*).

Hollow swellings, varying from .5 to 2.5 cm. in length by 3-4 m.m. in width, on the midrib and lateral veins of the leaves of the tulip tree. Monothalamous. Occurs on Tulip tree (*Liriodendron tulipifera*). Not common.

Spiræa Pod Gall (*Cecidomyia salicifolia*).

The leaves are folded in such a way as to assume the appearance of a pod. The pod is formed by the folding of the leaf along the midvein, and the bulging out of the sac thus formed, the outer margin of which is closely united. The pods vary in size, the largest being about five-eighths of an inch long. Occurs on Spiræa (*Spiræa tomentosa*). Common.

Willow Club Gall (*Cecidomyia rigida*).

This gall is formed on the lateral shoots of the Bush Willow, an enlargement of the whole stem, tapering from the centre to both ends. Occasionally galls are found having terminal shoots growing from them. The gall is about three-quarters of an inch long. Occurs on several species of Bush Willow (*Salix sp.*).

Goldenrod Bunch Gall (*Cecidomyia solidaginis*).

It is found on the main stalk of Goldenrod. An apical gall which prevents the natural elongation of the stem. This unnatural accumulation of several hundred leaves into a globular mass is the result of injury to the terminal bud and consequent arrest of growth in length. Occurs on Goldenrod (*Solidago sp.*). Very common.

Goldenrod Ball-Gall (*Trypeta solidaginis*).

This is a globular ball-like enlargement of the stem of Solidago, about 2½ cm. in diameter. Pithy in structure, hypertrophy monothalamous, the central cell irregular in shape and containing a large fat larva which develops into a fly with banded wings. It is green in summer and woody in winter. Occurs on Goldenrod (*Solidago sp.*). Very common.

Vein Gall on Oak (*Cecidomyia quercus-majalis*).

These galls are produced along the veins or the under side of the leaves of the Red Oak. They are, narrowly oval, inflated galls much like the Cecidomyia pudibunda on Carpinus. The surface of the gall is netted with veins. The wall is quite thin. The opening to the gall is upon the upper side of the leaf, and runs the full length of the gall. The gall is hollow and the interior wall smooth. Green or brown in color. Occurs on Red Oak (*Quercus rubra*). Not common.

Hickory Nut Gall (*Cecidomyia caryæ-nucicola*).

A malformation of the nut produced by a Cecidomyiid, resulting in the formation of large irregular knobs all over the husk of the nut, containing thickwalled cells. Hypertrophy polythalamous. Occurs on Hickory (*Hicoria Alba*). Not common.

Alder Bud Gall (*Cecidomyia serrulata*).

A rounded monothalamous bud gall, a deformation of the terminal bud of the Alder. Occurs on Alder (*Alnus sp.*). Not common.

Midrib Gall on Virginia Creeper (*Cecidomyia sp.*)

This gall is green and succulent. It forms along the midrib of the leaf and occasionally along the side veins. It is flat and generally double, that is, on both sides of the vein. It is on the under side of the leaf and is really an enlargement or thickening in a fold on the leaf near the midrib. It

varies from 1.5 to 4.5 cm. in length, and from .8-1 cm. in width and .4-.6 cm. in thickness. Through the gall runs a single chamber about 1 mm. in diameter. The opening to the gall runs the whole length of the gall and is on the upper side of the leaf. The opening is lined with minute white hairs. In the gall are minute orange larvæ about 1.5 mm. x .6 mm.-2 mm. Occurs on Virginian Creeper (*Ampelopsis quinquefolia*). Common at Guelph.

Midrib Gall on Touch-me-not.

An enlargement of the petiole or midrib of the leaf, protruding on both sides of it and averaging about 1 cm. in length x .4 cm. in width. Green, smooth and monothalamous. A single chamber running the length of the gall and containing several minute white larvæ. Occurs on Touch-me-not (*Impatiens fulva*). Common.

Fruit Gall on Wood Nettles.

This gall consists of a malformation of the fruit of the woodnettle and sometimes all the fruiting stem is covered with them. The gall is juicy and quite soft in structure and in shape is a long oval with a pointed apex and sessile. The hypertrophy is variable, being sometimes mono and sometimes dithalamous. In the larval chamber, which is about 1 mm. in diameter and surrounded by light colored tissue, are one or two small fat larvæ light brown in color. The larva is segmented and legless. The gall is about .5 cm. in diameter and 1 cm. in length. It is green in color. Occurs on Wood Nettle (*Laportea Canadensis*). Not common.

Willow Egg Gall (*Euura ovum*).

Oval galls on the sides of the twigs of the Bush Willow. The galls are hard and woody and usually the same color as the stem. Occurs on Bush Willow (*Salix sp.*). Common.

Dogwood Club Gall (*Cecidomyia clavula*).

The galls are club-shaped and about 2 cm. in length. Inside is an elongated channel containing a single larva. They are found on the terminal twigs and the color is about the same as the bark. Occurs on Flowering Dogwood (*Cornus florida*). Not common.

Oak Spangles (*Cecidomyia poculum*).

Saucer-shaped galls in clusters on the under surface of the leaf. Usually pale red in color. Occurs on White Oak (*Quercus alba*). Common.

HYMENOPTERA.

Acraspis macrocarpa.

This beautiful little gall occurs quite commonly upon the leaves of *Quercus macrocarpa* in this vicinity. It is small, average diameter 3 m.m., and in form globular to oval. Above, it is bright red, fading to yellowish green near the base, where it is joined to the leaf by a small portion of the surface so that it is easily detached without injuring the leaf. The surface of the gall is netted with innumerable fissures, between which are small elevations with very short spines. When on the underside of the leaf the gall is white in color. It is monothalamous and the smooth, hollow chamber contains a single small white larva. The galls occur along the veins.

They much resemble *Cynips pisum*, but are monothalamous and also resemble *Cynips echinus*, but the spines on this gall are scarcely noticeable and *Cynips echinus* and *Cynips pisum* are both polythalamous. Occurs on Burr Oak (*Quercus macrocarpa*). Common.

The Oak Petiole Gall (Andricus petiolicola).

This is a midrib or petiole gall. It is hard and woody and projects on one side, generally on the lower. It averages 1.2 cm. by .7 cm. and 8 m.m. wide. It contains several cells lined with hard white tissue which in some cases are arranged like the seed cases in a core of an apple. In each of these is a small white larva, apparently legless, and covered with a viscid transparent secretion. The gall is green or red and more or less roughened on the outside. Occurs on White Oak (*Quercus alba* and *Quercus primoides*). Common.

Rose Root Gall (Rhodites radicum).

A smooth, irregularly rounded, brownish swelling upon the root of the Wild Rose. Reddish brown in color, quite light and pithy in structure and containing numerous cells. From 3 to 5 cm. in diameter. Occurs on roots of Wild Rose (*Rosa* sp.). Not common.

Spiny Ball Gall on Wild Rose Leaf (Rhodites bicolor).

This is a very beautiful little gall which is rare in this vicinity. It is monothalamous and is formed upon the leaf of the wild Rose and sometimes all the leaflets are transformed in this way. The gall is a thin-walled ball, red or green in color and covered with short spines. It is monothalamous and contains one small larva about $\frac{3}{4}$ m.m. long. The gall is about .75 cm. in diameter. The wall is about $\frac{3}{4}$ m.m. thick. There is no opening. The inside is quite smooth. Occurs on Wild Rose (*Rosa sp.*). Not common.

Rose Stem Gall (Rhodites globulus).

This gall is found upon the stem of the Wild Rose. It consists of an abrupt corky enlargement of the stem. It is about 2-2.5 cm. in length and about 1-1.5 cm. in width. It is quite smooth on the outside, not at all pubescent, and green or red in color.. A single long chamber runs longitudinally through the gall about 3 m.m. in diameter and irregular in shape. In this are small larvæ about 3 m.m. in length. The larva is dark grey with a lighter head and tail and is legless. Occurs on Wild Rose (*Rosa Carolina*). Not common.

Mossy Rose Gall (Rhodites rosæ).

It is composed of a mass of hard, small cells clustered around a branch or twig. These cells are covered with a dense thick mass of green filaments which grow from them. The gall is monothalamous and from 1.5-2 cm. in diameter. Occurs on Wild Rose (*Rosa Carolina*). Common.

The Larger Oak Apple (Amphibolips confluentis).

Thin walled and globular, about 4 cm. in diameter. Exterior surface smooth (not pubescent) and somewhat irregular. Interior filled with a spongy mass of fibres, very loosely attached to the exterior but tightly attached to an interior woody cell in which the larva lives. Green in the early part of the season, later turning brown and brittle. Generally produced on the upper part of the leaf from the end of one of the veins. Occurs on Red Oak (*Quercus rubra*) and other closely related species. Common.

Hedgehog Gall on Oak (Acraspis erinacei).

A round or oval gall growing on the midrib of the leaf. About 1 by 5 c.m. The gall is white or yellowish and covered with fine bright pink or red spines about 1-2 m.m. in length. Attached to the leaf at a point about

the middle of the under side of the gall. Hypertrophy polythalamous. Larval chambers about 1-2 m.m. in diameter. It is found on the upper side of the leaf. Occurs on White Oak (*Quercus alba*). Common.

Furry Ball Gall on Oak (*Neurotus floccosus*).

This is a small spherical gall about 3 m.m. in diameter, which occurs on White Oak on the veins of the leaves upon the under side of the leaf. The gall is thickly covered with fine short hair which forms a cushion all round it. The gall is rather hard, and in the centre of it is a very small thick-walled shell about .25 m.m. in diameter. Occurs on White Oak (*Quercus alba*). Not common.

Pointed Bullet Gall on Oak (*Holcaspis duricaria*).

A spherical ball-like gall produced upon the stem of White Oak and Burr Oak. A short point at the apex of the gall distinguishes this species from *globulus*. Hard and woody, with a small cavity in the centre, containing a small, oval monothalamous, thin-walled, larval chamber. Occurs on Burr Oak (*Quercus macrocarpa*). Common.

Little Oak Apple (*Andricus palustris*).

This gall is produced by a malformation of the leaf blade, nearly always at the outer edge. It is a spherical, monothalamous, hollow ball, projecting from both sides of the leaf. It is from .9-1 cm. in diameter and comparatively thin-walled. The interior cavity is lined with smooth tissue and contains only a small thin-walled ball which rolls about freely in the gall. The single chamber of this ball contains a small larva. This ball is about 2 m.m. in diameter. The insect emerges, through a small hole cut in the side of it, in May. The gall is green or green and red. Occurs upon the leaves of Pin Oak (*Quercus palustris*). Not common.

Oak Midrib Gall (*Andricus piger*).

This gall is an irregular, woody swelling of the midrib of Burr Oak. It averages about 7/8 inches in length, and about 5/8 inches in diameter. Externally it is green, glabrous or slightly pubescent and projecting on both sides of the leaf. Internally it is dense and somewhat woody in structure, and containing numerous small cells about .5 m.m. in diameter, surrounding each of which is a layer of harder tissue. These are the larval cells. The gall-flies escape early in June through holes cut through the gall. Occurs upon leaves of Burr Oak (*Quercus macrocarpa*). Common.

Furry Ball Gall on Oak (*Andricus lana*).

This gall is produced upon the midrib upon the under side of the leaf of the Burr Oak. It is a white, furry, hemispherical mass, varying from 4-11 m.m. in diameter. This is composed of innumerable fine, woody fibres to which are attached small round kernels, in each of which is a minute white larva. These kernels are attached to the midrib of the leaf. Occurs upon leaves of Burr Oak (*Quercus macrocarpa*). Not common.

Willow Apple Gall (*Pontania pomum*).

A smooth, fleshy, sessile, globular or slightly oval monothalamous gall, like a miniature apple. About 1 c.m. in diameter, growing on one side of the midrib of the leaf and extending to its edge or beyond it. The principal part of the gall projects from the underside of the leaf. Color greenish yellow, often with a rosy cheek. Mature about July 31st. Occurs on many species of scrub willows (*Salix sp.*) Common.

Flat Galls on Willow (*Pontania hyalina*).

Fleshy galls, occurring in two parallel rows, one on either side of the midrib, sometimes touching, but not originating from the latter and rarely extending to the edge of the leaf. Sometimes as many as twenty to a leaf. In other cases confined to a row on one side of the leaf, or occasionally occurring singly. Shape irregular, elongate-ovate, projecting equally in both surfaces of the leaf. Color on upper side more or less brownish red, beneath white with slight purplish tinge. "Eggs and larva are subject to attack of mites, thrips, a curculionid (Anthonomus sycophanta) and a lepidopterous larva which eats out the entire interior of the gall tenthredinid larva and all." (From Marlatt. "Revision of Nematinae.") Occurs on many species of scrub willow (*Salix sp.*). Very common.

Pithy Blackberry Gall (*Diastrophus nebulosus*).

A large, oblong, polythalamous stem gall, 1 to 3 inches in length, and 1 to 1½ inches in thickness. The surface is uneven with deep longitudinal furrows, which divide the gall more or less completely into four or five portions. Occurs on Blackberry (*Rubus sp.*).

Lettuce Tumor Gall (*Aulax timidus*).

It occurs on the stem of Wild Lettuce. It is an irregular, oval, polythalamous, knotty enlargement of the stem varying greatly in size. The interior is soft and pithy. Occurs on Wild Lettuce (*Lactuca Canadensis*). Not common.

Oak Button Gall (*Neuroterus umbilicatus*).

This gall appears as a small button-like enlargement on the upper and lower surfaces of the leaves of the Oaks. Occurs on Burr Oak (*Quercus macrocarpa*). Not common.

Oak Bullet Gall (*Holcaspis globulus*).

It is found on the twigs of many species of Oak. It is a smooth, round, monothalamous gall. The interior is corky, with a small lighter coloured oval cavity in the centre, containing the larva. It grows singly or in clusters of two or three. Occurs on Burr Oak (*Quercus macrocarpa*), and White Oak (*Quercus alba*). Common.

Oak Pea Gall (Cynips pisum).

This is a spherical dithalamous gall, resembling a small pea. The surface is fissured or netted with depressions between which are elevations. It resembles a small pea. Occurs on White Oak (*Quercus alba*) and Burr Oak (*macrocarpa*). Not common.

Barley Jointworm (Isosoma hordei).

A small gall forming a woody growth which fills up the cavity of the stalk and causes the joints to swell, and the stalk to topple over. The larva remains in the straw over winter, and the adults emerge in the spring.

Huckleberry Gall (*Solenogopheria vacinii*).

Rounded or elongated galls 1-2 c.m. in diameter on the stem of the huckleberry. They are green or red in summer, and brown, hard and woody in winter. Occurs on Huckleberry (*Gaylussacia resinosa*). Common.

HEMIPTERA.

By Rev. Thomas W. Fyles, D.C.L., F.L.S., Levis, P.Q.

Bugs! "Disgusting!" says the fair reader who may chance upon this article; and truly I agree with her. I have no word bad enough for "the terror that walketh in the darkness"—the old, original "bug-a-boo."

I shall never forget a night I spent on board a small river-steamboat. The vessel left its wharf very early in the morning, and a friend (?) persuaded me to take a berth on board. What a night I spent. No sooner were the lights put out, than I began to experience a creepy sensation that effectually "murdered sleep." (Fig. 18.)

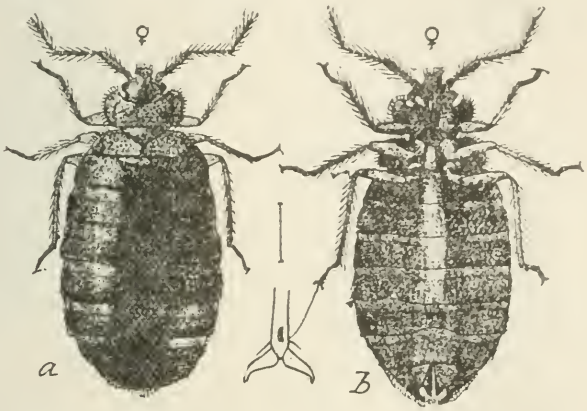

Fig. 18.—Female Bed-bug, much enlarged. *a*, upper, and *b*, under surface (after Marlatt.)

Confined in a small crib, and having no light, my case was worse than that of a certain church dignitary and his chaplain who, when on a visitation tour, sought shelter in a cottage, late one night. They were welcomed gladly; and the only spare-bedroom was placed at their service. On retiring the great man turned down the bed-clothes, but quickly turned them back again, for there were things in possession of the bed. He thought discretion the better part of valour, took his valise for a pillow, wrapt his long cloak around him, and stretched himself upon the floor. There he soon slept the sleep of the just. Meanwhile his companion, ensconsed in an armchair, amused himself by writing a parody on some well-known lines. One verse of his production read thus:—

"No dirty blanket enclosed his breast;
Nor in sheet, nor in quilt we wound him;
But he lay like a clergyman taking his rest
With his camlet cloak around him."

In my entomological investigations in the Province of Quebec, I have met with representatives of the undermentioned families of bugs:—

Corimelænidæ.
Pentatomidæ.
Coreidæ.
Lygæidæ.
Capsidæ.
Acanthiidæ.
Tingitidæ.
Aradidæ.
Phymatidæ.
Nabidæ.
Reduviidæ.
Hydrobatidæ.
Belostomatidæ.
Nepidæ.
Notonectidæ.
Corisidæ.

I shall not attempt to give an orderly and systematic account of the various species, belonging to these families, that have come in my way. The space at my disposel in the report will not admit of this. I shall tell, in a desultory way, of some of the more remarkable and interesting of the species, mentioning the family to which each of them belongs.

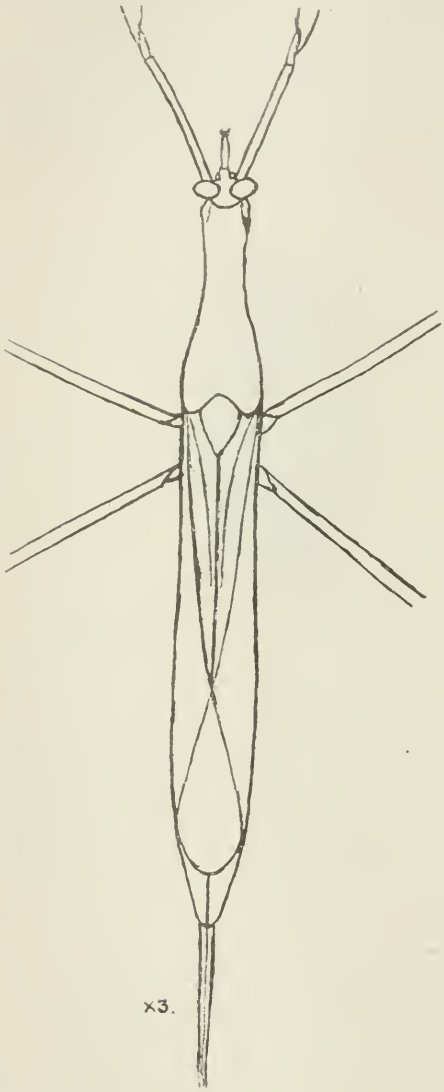

FIG. 20.—Ranatra quadridentata (greatly enlarged).

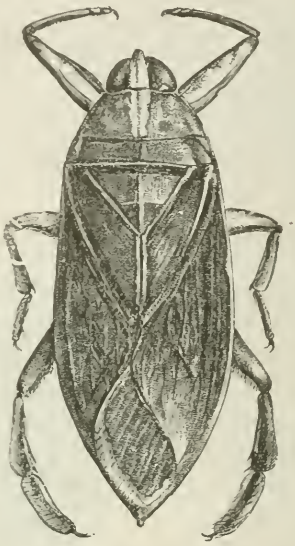

FIG. 19.—Giant Water-bug.

FIG. 21.—A typical Bug.

FIG. 22.—Corimelæna atra.

First then, the Giant of the Bugs, far beyond all others of our bugs in size and strength, is *Belostoma Americanum*, Leidy, (Fig. 19), belonging to the *Belostomatidæ*. This creature attains a length of nearly two and a half inches, and an expanse of wings of four inches. Its hindmost pair of legs are an inch and three-quarters long, and are used for propelling it through the water. The colour of the insect is dark brown. In the breeding season it occasionally leaves the water; and it is capable of long flights. Its wings are true bug-wings, having the upper part horny, and the lower

part membranous. Its eyes protrude and resemble shining black beads. It has a stout proboscis for piercing its prey, which consists of fishes, tadpoles, etc. Its long stout front legs terminated with sharp claws enable it to grasp its victims firmly.

Another remarkable water-bug is *Notonecta undulata*, Say, belonging to the *Notonectidæ*. This insect is boat-shaped, but the keel is along its back; so it swims with its back downwards—its long legs bending over its sides, and serving as oars. In its movements it reminds one of a boy swimming on his back.

A still more noteworthy insect is *Ranatra quadridentata* (Fig. 20), belonging to the *Nepidæ*. Length is the characteristic of this insect. It has a long slim body, long thin legs, long antennæ, and long terminal respiratory tubes; its front legs are constructed for grasping its prey. It frequents shallow streams, *walking on the bottom*, and lifting the tips of its breathing tubes to the surface for air.

But, if it is wonderful to see a winged insect walking at the bottom of the water, it seems all but miraculous to behold one walking with ease and swiftness on the top. Yet this is the habit of *Hygrotrechus remigis*, Say, and also of *Limnoporus rufoscutellatus*, Fab., both of which are common with us. The former is black; the latter, pale reddish brown. Both belong to the *Hydrobatidæ*.

Of bugs that frequent plants, the Negro Bug (Fig. 22), *Corimelæna atra*, Am. et Serv., in the *Corimelænidæ*, is particularly obnoxious. It lays its eggs on small fruits, raspberries, etc. Should a person, by mischance, put a berry that has been visited by the bug into his mouth, a most nauseating taste and smell will quickly cause him to eject it. The bug is a pretty, compact little insect, of a shining black, and almost as broad as it is long. It is often seen on wild strawberry plants; and, when disturbed, it scuttles away to the underside of a leaf.

An insect of economic importance is found in the *Pentatomidæ*. I refer to *Stiretrus fimbriata*, Say. It preys upon the Potato Beetle, *Doryphora decem-lineata*, Say. Unfortunately, it shares the fate of the beetle and is poisoned by Paris Green. *S. fimbriata* is really a handsome insect. Its dark brown wings and deep red thorax outlined with crome-yellow; and it has a peculiar mark, in the middle of the back, of the same colour, and, in shape, resembling an elongated horse-shoe.

Another useful bug is *Podisus placidus*, Uhler (Fig. 23), belonging to the same family as the foregoing. It preys upon the Imported Currant-worm, *Nematus ventricosus*, Klug., and other larvæ. A description of this bug will be found on page 342 of Saunders' "Insects Injurious to Fruits."

In the same genus comes *Podisus cynicus*, Say, a fine bug seven-twelfths of an inch long, and four-twelfths wide. It is of a reddish-brown colour, slightly mottled with black.

A very pretty little bug in this family is *Cosmopepla carnifex*, Fab. It is black, bordered with red, and crossed on the thorax with red. It has also two red spots on the back.

Another fine insect in the same family is *Euschistus fissilis*, Uhl. It is half an inch long and one-third of an inch wide. In colour it is ochreous or pale brown, and it is thickly covered with minute black dots.

A somewhat smaller insect is *Euschistus tristigma*, Say. Its body colour is darker than the preceding; and the flattened edges of the abdomen are marked with alternate black and orange patches. The wings of this species are splendidly iridescent.

A third insect that comes, I think, in the same family is *Homœmus ænifrons*, Say. It is reddish-brown in colour, clouded with darker brown; and it has a peculiar mark, like an elongated cone rising from the end of the abdomen towards the middle of the back. These creatures frequent the heads of grass.

Acanthosoma cruciata, Say, is an interesting species in the *Pentatomidæ*. In colour it is ochreous with brown markings, and it has the appearance of having been oiled and varnished. Its back is marked with a floriated cross. When the wings are spread the abdomen on the upper surface is seen to be tinged with vermillion.

But the finest of our species of *Pentatomidæ* is undoubtedly *Pentatoma ligata*, Say. It may readily be known. It is a robust insect, of a rich Brunswick green, bordered with orange red; and it has an orange spot on its back. The insect is somewhat rare at Quebec.

In the family *Coreidæ*, to which the common Squash-bug, *Anasa tristis*, De G., belongs, we have *Alydus eurinus*, Say—a dingy insect, long and narrow with lighter coloured wings.

FIG. 24.—Assassin Bug.

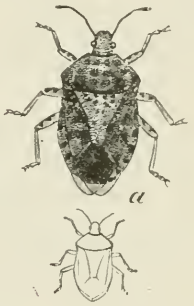

FIG. 23.—Podisus placidus.

FIG. 25.—Acholla spinosa.

In the *Lygæidæ* we have the pretty bug *Lygæus turcicus*, Fabr. This insect is a long oval in shape, black, with a red band across the shoulders, and a red St. Andrew's Cross upon the back. The underside of the abdomen is lurid red.

Among the bugs injurious to plants may be reckoned *Pecilocapsus lineatus*, Fab., (4-vittatus, Say), a pretty yellow bug, with black lines on the wings, and two very conspicuous black spots on the thorax. These insects do injury to the leaves of currant bushes and garden plants; and they also taint the small fruits. They and the next mentioned insect belong to the *Capsidæ*.

Capsus lineolaris, Beauv., the Tarnished Plant-bug is ochreous with fuscous shades. It has dark spots along the edge of the abdomen. These insects damage the leaves of pear trees, apple trees, etc.

The *Tingitidæ* are a remarkable family of bugs. The species are very small and very elegant. Seen under a microscope, they appear to be covered with lace-work. On account of this, they have been called "Lace Bugs." The common species is *Corythuca arcuata*, Say. I have found a beautiful species on the Island of Orleans that I have not yet identified. The insects are found on the underside of Alder leaves.

The "Flat Bugs" or *Aradidæ* are found under bark, and in crevices of trees. They are predaceous. In vol. XXXV. of the *Canadian Entomologist*, I have given a full description of a new species that I have taken at Quebec, and have named *Aradus luteolus*.

A bug of remarkable shape is *Coriscus subcoleoptratus*, Kirby, in the family *Nabidæ*. It has the head and thorax narrow, and the abdomen greatly widened in proportion to the size of the insect. It is suggestive of a flask. Its body colour is black, but the abdomen has a yellow border. The legs and long sharp proboscis are yellow. Its wings are very diminutive.

In the late summer when our country road sides are adorned with the Golden Rod, the pretty little Fritillary, *Argynnis Myrina*, Cram., may be seen in numbers sporting about the flower heads. Here and there one of these butterflies may be seen motionless—lifeless If one will take the trouble to look into a case of the kind, he will probably find that the ill-starred insect has fallen into the clutches of a lurking foe, *Phymata erosa*, Fabr., belonging to the *Phymatidæ*. This strange insect is yellow beneath, and yellow marked with brown above. It has yellow legs and proboscis, and angulated thorax and abdomen. It lies back downwards among the blossoms of the Solidago, patiently awaiting its prey. A butterfly alights with outspread limbs. One of these comes within reach of the expectant bug. Instantly the extended tarsus of the bug springs back over the leg of the butterfly, and into a toothed groove in the disproportionately large tibia of the bug; and the victim is held securely, while its foe thrusts its long proboscis into its body and drains away its life juices.

I will mention only two other species—they are known as "Assassin Bugs," (Fig. 24) for they make other insects their prey. They belong to the *Reduviidæ*, to which the "Kissing Bug" of ill-repute, *Melanolestes picipes*, H.S., also belongs.

Acholla multispinosa, De G. (Fig. 25), is a brown insect, two-thirds of an inch long. It has a forbidding appearance, which is well, for it is a dangerous creature. On pages 73-5 of the Thirtieth Annual Report of the Entomological Society of Ontario, Dr. Bethune has given a well-authenticated account of the death of a child from a puncture from the proboscis of a bug of this species. The child was wounded under the knee, and blood poisoning ensued.

The other species is *Opsicœtus personatus*, Linn. It is a larger insect than the last mentioned, being three-fourths of an inch long; and—with the exception of the under wings—it is wholly black, or very dark brown. When its wings are outspread, its abdomen is found to be hollowed out, like a scoop or spoon. This species enters houses in search of *Acanthia lectularia*, Linn. Its larva has the habit of covering itself with a coat of dust or mud, and, so disguised, escapes notice till its motions betray its presence.

I do not think the *Reduviidæ* go out of their way to inflict injury upon human beings. I think it may be said of them that, *unmolested*, they do not molest.

The late highly esteemed J. Alston Moffat once told that he had held a specimen of *A. multispinosa* firmly between his finger and thumb, while he searched for a pin wherewith to transfix it. The bug managed to get its head free, and then, *sent in its little bill for damages*, greatly to Mr. Moffat's discomposure.

Disagreeable as many species of the Hemiptera undoubtedly are, they yet serve valuable purposes in keeping down the numbers of other and injurious insects; and the habits of some of them are so remarkable as to claim more than a passing notice. In dealing with them the poet Cowper's rule is worthy of attention—*of course entomologists are exempt from it*! He says:—

"The creeping vermin, loathsome to the sight,
And charged perhaps with venom, that intrudes,
A visitor unwelcome, into scenes
Sacred to neatness and repose, th' alcove,
The chamber, or refectory, may die:
A necessary act incurs no blame.
Not so when, held within their proper bounds,
And guileless of offence, they range the air,
Or take their pastime in the spacious field;
There they are privileged: and he who hunts,
Or harms them there, is guilty of a wrong,
Disturbs th' economy of Nature's realm,
Who, when she formed, designed them an abode,
The sum is this. If man's convenience, health,
Or safety, interfere, his rights and claims
Are paramount, and must extinguish theirs
Else they are all—the meanest things that are—
As free to live, and to enjoy that life,
As God was free to form them at the first,
Who in His sov'reign wisdom made them all."

The Task—Line 568 to line 587.

BASSWOOD, OR LINDEN, INSECTS.

By Arthur Gibson, Experimental Farm, Ottawa.

The following notes on insects found feeding on basswood, *Tilia Americana*, are chiefly from records handed to the writer since the publication of a paper on the above subject which appeared in the 34th Annual Report of this Society, and of a further paper in the 35th Annual Report. In the first paper 94 species are listed, and in the 1904 Report further notes on some of these insects are given, as well as notes on 8 other species, which brought the list up to 102.

ATTACKING THE FOLIAGE.

Order Homoptera.

Mr. W. Metcalfe, of Ottawa, who has devoted considerable time to the collection and study of homoptera and hemiptera, has been good enough to give me 15 records, which I am glad to include here. All of the species found by him were on basswood.

103. The common "Buffalo-tree hopper," *Ceresa bubalus*, Fabr. Five specimens of a dark form taken, Ottawa, July 14, (Metcalfe).

104. *Telamona reclivata*, Fitch. Ottawa, July 1, (Metcalfe). Mr. Metcalfe tells me that he has taken later in July five specimens, all on basswood, of a species of *Telamona*, which does not seem to be *reclivata*.

105. *Ormenis pruinosa*, Say. Mr. Otto H. Swezey, in his "Preliminary Catalogue of the Described Species of the Family Fulgoridæ, of North America, North of Mexico" (Ohio Dept. Agric., Div. Nursery and Orchard Inspection, Bull. 3) mentions basswood among a great many other food plants of this homopterous insect. The insect is rare in Ontario.

106. *Lamenia vulgaris*, Fitch. Ottawa, July 1, (Metcalfe).

107. *Bythoscopus variabilis*, Fitch, var. Ottawa, June 19 to 24, (Metcalfe). This insect is a near relative to the very injurious grape vine leafhopper which is so abundant some seasons in Ontario.

108. *Agallia novella*, Say. Ottawa, June 24, (Metcalfe).

109. *Diedrocephala coccinea*, Forst. Ottawa, bred from basswood, maple and hickory, (Metcalfe).

110. *Deltocephalus Sayi*, Fitch. Hull, Que., July 1, (Metcalfe).

111. *Empoasca flavescens*, var. *Birdii*. Ottawa, Aug. 14, (Metcalfe).

112. *Empoasca mali*, LeB. Hull, Que., June 24; Britannia-on-the-Bay, Ont., Aug. 7, (Metcalfe). This insect, which is known as the apple-leaf hopper, is, according to Smith, "seriously troublesome in some years" in New Jersey, but it is not a pest of any importance in Canada.

113. *Typhlocyba rosæ*, L., the common rose-leaf hopper. Ottawa, July 1, (Metcalfe).

114. *Typhlocyba querci*, Fitch, var. *bifasciata*, G. and B. Hull, Que., June 24; Britannia-on-the-Bay, Ont., Aug. 7, only found on basswood, (Metcalfe).

Order Hemiptera.

115. *Lygus invitis*, Say. Hull, Que.; Ottawa; August, 60 specimens, (Metcalfe). This insect belongs to the same genus as the common well known pest of garden plants, the Tarnished Plant bug, which is very abundant in many parts of Canada.

116. *Gargaphia tiliæ*. Walsh. Ottawa, taken only on basswood, August, (Metcalfe). In Smith's List of New Jersey Insects, it is stated that this insect "ranges from New York to Virginia."

117. *Tingis arcuata*, Say. Hull, Que., July 1, (Metcalfe). In Packard's Forest Insects the species is mentioned as having been found on the under sides of the leaves of the White Oak.

118. *Coriscus inscriptus*, Kirby. Ottawa, June 19, (Metcalfe). Smith states that this insect "occurs from Canada to Virginia and California."

Order Lepidoptera.

19 of 1903 List. *Ennomos alniaria*, L. Although the larva of this common moth has been recorded on several occasions by other writers as feeding on basswood, it was not until the past season that the caterpillar was found on that plant in the Ottawa district. At Meach Lake, Mr. C. H. Young collected a larva which pupated on Sept. 10.

119. *Smerinthus jamaicensis*, Drury. In the preparation of my first list of basswood insects, I omitted to include this species, the larva of which feeds on a variety of plants, such as elm, apple, plum, willow, poplar, ash, birch, basswood, etc. In Lugger's Fourth Annual Minnesota Report, plate XV., there is a good figure of the mature larva. In Canada, the species is widespread, occurring as far west as Medicine Hat, Assa., from which place, in 1900, eggs were sent to the Division of Entomology, by Mr. T. N. Willing. The eggs hatched on June 5, and notes were taken on the larval stages. The larvae were fed on willow and poplar.

120. *Mineola indigenella*, Zell. var. *nebulella*, Riley? In 1904 we reared from apple some specimens of a small moth which seems indistinguishable from this apple feeding species. The habits and appearance of our larvae, however, are different from those of *indiginella* as published by Riley and Saunders, and Dr. Fletcher thinks that it cannot be the same. On Sept. 20, 1905, the writer found on basswood three of the larvae, all on the upper side of the leaf. In each case the larva was resting under a slender tent of silk, which was about half an inch in width and nearly an inch in length. The three leaves were all put in the same breeding jar, but two days after collection I was surprised to see only one larva in the jar. On looking closely, however, I found portions of each of the other two, and there was no doubt

that a serious tragedy had taken place. The remaining specimen spun a cocoon in a fold of a leaf on Sept. 23. When mature the caterpillar is five-eights of an inch long, body pale green, the black noticeably washed with yellow. Head rounded, green, marked with numerous small reddish-brown dots and large blotch-like spots, the small dots being particularly on upper portion of head. On each side of the body there is a dark brown stripe, broken in places, and touching these two stripes crossing the back is a series of conspicuous wide bands of the same colour. These and the side stripes have a very ladder-like appearance. The spiracles are black and very small, as are also the tubercles. From each of the latter there is a single pale hair. The feet are concolorous with the ventral surface of the body.

61 of 1903 List. *Apatela morula*, Grt. On several occasions recently the larva of this noctuid has been beaten from the foliage of basswood at Ottawa. The writer found the caterpillar on July 30 last, and Mr. C. H. Young collected mature specimens on Sept. 2 and 5. Other food plants are elm and apple. When full grown the larva is about two inches in length and is of a light olive grey colour. The head is black, and down the centre of the dorsum there is a wide, uneven, dark gray band, yellowish centrally. On body segments 4, 7 and 11 there is a conspicuous dorsal enlargement, which is bordered on the sides with black. Along the sides of the body are a series of V-shaped blackish marks, with the round black spiracle at the base. The hairs from the tubercles on the body are thin, whitish and rather inconspicuous. In March, 1901, Mr. Young found the cocoon of this moth under the bark of an elm tree, about four feet from the ground, and since that date in confinement, he tells me that two larvae entered soft dead wood to the depth of fully an inch and there pupated.

OCCURRING ON THE BARK.

Order Homoptera.

121. *Eulecanium cerasifex*, Fitch. On July 18, I collected some scales on basswood and elm. These were on the lower branches of some old trees growing near the Arboretum of the Central Experimental Farm. Through the courtesy of Dr. Howard, they were identified as the above species by Mr. Sanders. The scales were fairly abundant on both kinds of trees. In Mrs. Fernald's Catalogue of the Coccidæ of the World, the following food plants are given:—cherry, plum, peach, apple, pear, maple, oak, ash.

BORING INTO THE WOOD.

Order Coleoptera.

122. The Cherry Flat-headed Borer, *Dicerca divaricatu*, Say. Specimens of this insect were found in basswood on July 9 last by Mr. Frank Morris, of Port Hope, Ont., on the shore of Rideau Lake, near the Narrows Locks, Ontario. This insect, which is well known as being destructive to cherry and peach trees, is common in Ontario, and always injuriously abundant on maple and beech, as also sometimes on pine, birch, hickory and other trees. The mature insect is a brownish, or blackish bronzy beetle, of rather stout build, from three-quarters to almost an inch long.

84 of 1903 List. *Parandra brunnea*, Fabr. From the same wood as the specimens of *Dicerca divaricata*, Say, were taken. Mr. Morris also collected 30 specimens of *P. brunnea*, Fabr. This insect, while it is sometimes found in numbers as occurred at Rideau Lake in July last, is an uncommon species. It is widespread in distribution. The grubs live in the wood of stumps and old trunks of various deciduous and coniferous trees, the beetles being found under the loose bark.

INSECTS INJURIOUS TO ONTARIO CROPS IN 1906.

By Dr. James Fletcher, Dominion Entomologist, Ottawa.

The weather conditions in Ontario during 1906 were very variable. In eastern Ontario the summer was exceptionally dry with two or three periods of excessive heat. The precipitation, however, for the whole province notwithstanding the shortage in the east was slightly above the average, and in western Ontario for the month of October was abnormally large. Crops were on the whole good in nearly all districts, both in quality and quantity.

Grain Crops were little injured by insects. Spring wheat was particularly free from insect attacks of all kinds and little was heard of rust. Fall wheat was decidedly above the average, and the Hessian Fly seems almost to have disappeared. Not a single report of Joint-worm in Ontario crops was received. Barley was one of the best crops which has been harvested for many years. Oats in the western counties were heavy, and there was some difficulty in harvesting, owing to the crop being lodged by rain storms. In the eastern counties, the quality was high for the most part, although a few crops were light for lack of timely rains. Grasshoppers in a few localities reduced the yield by cutting off the grains just before ripening. Peas were a good crop and the Pea Weevil was hardly mentioned. The area being sown to this important crop is again gradually increasing. The corn crop throughout the province was exceptionally good, both for the silo and for grain.

Roots in the western counties were good, but in the east were rather small and dry for lack of fall rains. There was very little injury this year to turnips by the Turnip Aphis, the only reports of serious injury coming from the counties of Victoria, Durham and Northumberland. Potatoes in the east were small but of high quality. There was little complaint of loss from Potato Rot, largely due to the fact that farmers are spraying much more systematically than hitherto to control this destructive disease. The standard remedy,Poisoned Bordeaux mixture, made with six pounds of copper sulphate, four pounds of unslaked lime, and eight ounces of Paris green in 40 gallons of water, has given very satisfactory results wherever tried. The experiments carried on at Ottawa regularly every year by the Horticulturist of the Central Experimental Farm have proved conclusively that three sprayings of the fields, the first one being applied in the middle of July, and the subsequent ones two weeks apart afterwards, give very paying returns. A fourth spraying gives better results, but it seems difficult to get farmers to make this extra application. Cutworms, although little complained of, were abundant and destructive in some places. Wherever tried, the poisoned bran remedy surprised those who used it with its effectiveness. Even in an exceptional and widespread outbreak in the grain and sugar beet fields of the West, this same remedy proved so remarkably successful, that many letters were written to newspapers and agricultural journals, giving the results of trials by those who had benefited from it.

Fodder Crops. Clover was attacked to some extent by the Clover-seed Midge, but on the whole, the crop of seed was above the average for quality. In the eastern counties, clover fields were remarkably thinned, owing to the mild winter with little snow, which was very severe on all meadows. The Black Army-worm, *Noctua fennica*, and the Clover Cutworm, both levied heavy toll on the very much reduced stand of clover. Rape, which is now being much more grown than formerly, was severely injured in several places by the caterpillars of the Small White Cabbage Butterfly, which appeared in vast numbers during the months of September and October.

An interesting observation was made on the Experimental Farm, where a field of late turnips was practically cleared of swarms of these caterpillars by the English Sparrow. The observation was made by Mr. B. Nothnagel, who watched them for several days, and by driving the birds away suddenly, induced them to drop their prey so that he might examine it. It is pleasing to have a good word to say for these very troublesome and destructive birds.

Vegetables. Carrots in gardens were attacked in a few places in the Ottawa district by the Carrot Maggot, or Carrot Rust Fly. This injury was not widespread nor quite so severe as in 1905. The remedies which gave the best results, were spraying the rows of plants immediately after they were thinned out, with a carbolic acid and soap wash, or with kerosene emulsion. Dusting the plants with hellebore was also apparently effective, but even in untreated beds, the insect disappeared about the beginning of July, and late sown carrots were entirely free of attack. The Onion and Cabbage maggots were conspicuously less destructive in many parts of the province than has been the case for some years This report, however, was not applicable in all parts, as was evidenced by the large numbers of enquiries for a practical remedy. Such, however, it must still be acknowledged has not so far been discovered. Good results on small areas were secured by dusting the plants from the beginning of the season once a week with a light dressing of powdered white hellebore, either pure or mixed with three times its weight of land plaster. A remedy which has often been recommended in newspapers is to brush away the soil from the bulbs as soon as these begin to form. In experimenting with this remedy, it was found rather difficult to apply in certain soils, but on the whole gave good results, particularly where the treatment was supplemented by dusting with the hellebore powder.

The Asparagus Beetle was a rather serious pest to the growers of this highly esteemed vegetable, and extended its eastern range in the province considerably during the past season. It was a troublesome pest as far east as Toronto, and specimens of the larvae were found by the writer during September on a small bed of asparagus on the Experimental Farm at Ottawa. The mature beetles were reared later, and the species proved to be *Crioceris asparagi*. The remedies which have given the best results are dusting the plants when the larvæ occur, with a mixture of freshly slaked lime and Paris green. This is more effective if it can be done when there is dew on the plants, or when they are wet either from rain or after being sprayed. Both the beetles and the larvæ may be beaten from the plants into nets or into open pans containing water with a little coal oil on the top. Poultry of all kinds when available are useful in eating the beetles when they first appear in spring.

Potatoes in gardens were seriously attacked and very much reduced in yield by the Potato Leaf Aphis, *Nectarophora solanifolii*, Ashm. This was in the east of the province, and the injury was much aggravated by the exceptional drought. The Colorado Potato Beetle was noticeably less injurious than usual in the early part of the season, but it made up for any early absence by the excessive abundance in autumn.

Fruit Crops. The apple crop of the province for 1906 may be described as rather short in quantity, but of excellent quality in the eastern counties. In western Ontario, the ravages of the Codling Moth were severe, and throughout the province more injury was done by the Plum Curculio to apples than in any previous year of which we have statistics. This, to some measure, may have been due to the poor plum crop, which was a character of the season, and which is accounted for in various ways by differ-

ent writers. Probably the factor of most importance was cold, windy weather at the time of blooming. Sweet cherries were much reduced by winter killing of the buds, and by the falling of the fruit after setting. Sour cherries gave an excellent crop free from insect injury. Small fruits were abundant with the exception of strawberries, which were very much winter killed in the eastern end of the province.

The Codling Moth was more complained of than for many years, and where spraying was not resorted to the loss was great. In western Ontario, apple growers are now recognizing that they must both spray and band their trees to prevent loss, and moreover that this work must be persisted in and carefully done year after year. Banding the trees alone is useless, unless the cocoons of the caterpillars which have resorted to them for spinning up are removed or crushed at short intervals. The bands should be put on from the middle of July, and examined at least once a week until no fresh cocoons can be found. The irregularity of development in the Codling Moth makes it sometimes difficult for fruit growers to understand the true nature of this insect. In the eastern part of the province there is normally only one brood of this insect, whereas, in the west, there are two. There are, however, always a few individuals of each brood which behave in an exceptional manner. Of a large number of caterpillars of the Codling Moth collected at Ottawa in July, 1905, a few emerged the same summer, and would in a state of nature have given a second brood of larvae. By far the larger proportion of the brood, however, behaved in the normal way, and went over the winter as larvæ. Just at the time of spinning up, there were three or four days of excessively hot weather, which may have been the cause of some of the caterpillars producing moths the first summer. Several of the moths emerged at the proper time the next spring; but a small proportion of the larvæ are actually still unchanged in their cocoons at the present time, (December 1906), and as they are healthy they will probably emerge next year, thus showing that of the same brood some emerged as moths within a few weeks of the time of spinning up, while others treated in exactly the same way could remain in the cocoon for very nearly two years. In coming to a decision as to the number of normal broods of an insect, a matter of great importance in devising remedies, it is therefore necessary to take a general view of the facts, and not come to conclusions from exceptional variations in habit.

The Plum Curculio was exceedingly destructive to apples in many parts of Ontario and Quebec provinces during the past summer. Some apples sent from a locality near Toronto contained three or four grubs to each apple. The apples were seen to be falling to an unusual extent towards the end of June, and were sent for examination as to the cause of this dropping. The grubs of the Plum Curculio leave the apples during the month of July, and change to pupæ in the ground, the beetles emerging a few weeks later in August and September, and passing the winter as beetles. Good results, as far as the insect is concerned, have been secured by ploughing up sod in infested orchards at the end of July or early in August. If there were any anxiety as to stimulating too late a growth of the trees by the practice, it might be offset to a large measure by sowing the land at once to a cover crop to absorb soil moisture, the object of the ploughing being to break up the cells in which the delicate and soft pupæ are contained, so that many of them might be crushed or injured by the operation or might be exposed to their bird and insect enemies. The remedy in Canada which has given the best results against the Plum Curculio, and which is decidedly the most economical of those usually recommended, is the

spraying of the trees with the Poisoned Bordeaux mixture in the same way that apple trees are sprayed for the Codling Moth and fungous diseases.

The San Jose Scale. There has recently been a renewal of interest in the subject of the San Jose Scale, which has been a little more noticed than for a year or two in districts lying beyond the main centres of infestation. As a matter of fact there is very little news to be given concerning the occurrence of this most injurious insect in Canada. It is satisfactory, however, that more attention should be paid to it by fruit growers. The standard lime and sulphur wash is quite effective, and if used, as has been advised, year after year, will keep trees clean enough to bear good crops, and if persisted in as a regular annual treatment, not only this insect but many others as well as fungous diseases of various sorts will be gradually exterminated or prevented from injuring the crop to a marked extent.

The Apple Maggot, *Rhagoletis pomonella*, Walsh. In 1896 the Apple Maggot, also known as the Railroad Worm from the brown marks made through the flesh of the infested apples by the maggots, was first noticed as an injurious insect in Canada. This was in Lennox County. Since that time very little injury has been noticed in the orchards where it was first observed, but during the past summer there are reports of rather widespread infestation throughout the adjoining County of Prince Edward. The injury is serious, as it renders the fruit unfit for the market without showing any very apparent marks on the outside. The injury is caused by slender white maggots about ¼ of an inch in length, which burrow in all directions through the flesh of the apple, feeding upon the pulp and leaving discoloured galleries. The white maggots are extremely difficult to see, but there may be several within a single fruit. The eggs are inserted beneath the skin of the apple by the females which are strikingly beautiful little black and white flies with banded bodies and golden eyes. These are about half the size of the ordinary housefly, and although they do not fly far are very active in their movements. There is only one brood in the year, but the flies emerge very irregularly and may appear at any time from midsummer until autumn. The young maggots become full grown in about six weeks, when they leave the apples and enter the soil for a short distance, where they turn to yellowish white smooth puparia. Apples which are infested for the most part fall to the ground, and the maggots remain in the fallen apples for a short time after they have fallen. Maggots from late laid eggs are often inside the fruit when it is picked. Consequently apples, which are apparently quite good at the time of packing, may in a short time become perfectly useless. All varieties of apples are liable to attack, but some much more so than others. As a general statement, early and sweet apples are most infested. It is possible that this serious enemy of the fruit grower may before long be one of the enemies which will require to be reckoned with every season. For many years it has been the cause of much loss in Vermont, Maine, and in parts of New York State. There have also recently been some rather serious outbreaks in Canada, in the provinces of Quebec and New Brunswick. It is satisfactory to know that the injury, even in the worst infested localities, fluctuates very considerably in intensity. The only practical remedy so far known is to destroy all infested fruit as soon as that fact is discernible. Windfalls should be gathered up carefully, and at short intervals during the summer, and should at once be fed to stock or destroyed in some other way. What is thought to be the most economical and effective way of doing this is to allow growing pigs to run in the orchard from July, when early apples which are particularly liable to attack begin to fall, and the animals should be kept in the orchard until all fruit is gathered. Sheep will eat apples if there is not too much grass on the

ground, but they are less useful for this purpose than pigs. Chickens and other poultry are likewise of service. The ground under apple trees in districts where the Apple Maggot is known to occur should be cultivated regularly. If no stock is available to which fallen fruit can be fed, it should be buried in a deep hole, and then covered up with two or three feet of earth. As the egg of the apple maggot is inserted into the flesh of the apple by the females with their sharp ovipositors, there is no spraying mixture which can be used against this insect.

Flowers. In flower gardens, one of the striking outbreaks of the year has been the abundance in many parts of Canada of the minute Moth-flies, or White Flies. Such specimens of these as have been examined seem to be the Greenhouse White Fly, *Aleyrodes vaporariorum*, and it is possible that they may have been introduced into gardens with fuchsias and other plants propagated in greenhouses, and owing to some climatic condition have this year increased out of doors to a much larger extent than is usual. Although extremely small, these minute fly-like sucking insects are very destructive. The larval and nymph forms bear a somewhat close resemblance to their near relatives the scale insects. Plants which were badly infested at Ottawa were cucumbers, tropæolums, fuchsias and lilac bushes, but many other kinds were also more or less attacked. White Flies are difficult to control, but may be kept in check by the constant spraying of infested plants with whale oil soap solution, or a diluted kerosene emulsion. In greenhouses probably fumigating with hydrocyanic acid gas is the best remedy. ,

Shade Trees. Ornamental shrubs and shade trees were severely attacked early in the season over a large part of the province by enormous numbers of plant lice, of many species. Trees particularly infested were soft maples by a species of Woolly Aphis, which was found in large clusters beneath the leaves of the Silver Maple, *Acer dasycarpum*, and its numerous varieties. Another new attack of the Silver Maple of more than usual interest was the wholesale destruction of the seeds by the larvæ of the Nitidulid beetle *Epuræa rufa*. The seed was produced in large quantities this year, and was ripe by the middle of June. Towards the end of the month some sacks of the seed were collected for sowing. They had lain on the ground for a few days; but were apparently in good condition. During July, however, it was found that nearly every seed was infested by slender, dirty-white grubs about ¼ inch long, with a testaceous roughened dorsal patch across the middle of each segment. Every seed contained from 12 to 18 of these grubs, which had reduced the contents of the seed to a green meal-like powder. When fully-fed, the grubs left the seeds and pupated near the surface of the ground. In August, large numbers of the beetles emerged. In the soil were also found many of the small cocoons of a parasite which has not yet emerged. The beetles of the family to which *Epuræa rufa* belongs are for the most part scavengers in habit, living upon dead and decaying animal and vegetable substances, but in this instance sound seeds were attacked, and the species can evidently be a destructive enemy to one of our favourite shade trees.

Birches of all kinds were covered from top to bottom with myriads of plant lice, so that by the middle of July the leaves began to fall noticeably. Early in July the abundance of Lady-bird beetles was noticed, particularly of the common Two-spotted Lady-bird *Adalia bipunctata*, and by the end of the month these had increased so much that the infested birch trees were almost cleared and the leaves took on a strange dirty appearance from the enormous numbers of the pupæ of the Adalia, as many as 18 to 20 being found in many instances on a single leaf. The good work done by

these insects in clearing the trees of their enemies was, however, only rewarded by these themselves proving a prey to another of nature's factors in preserving the balance of life. A very small percentage of these pupæ gave forth the beetles; instead, most of the pupæ produced a swarm of minute hymenopterous parasites.

Elm trees were badly attacked by the Woolly Elm-leaf Aphis, which, during the month of June, curled up the leaves of the elms used as shade trees, and made sidewalks and seats, or even walking beneath the trees, most unpleasant, owing to the showers of honey-dew which constantly fell from the clusters of plant lice. The Elm Soft-scale, *Lecanium canadense*, was also abundant and destructive in many places. The White Cedar or American Arbor-vitæ was seriously disfigured by the attacks of two minute moths, *Argyresthia thuiella*, Packard, and in far less numbers *Recurvaria thujaella*, Kearf. The injuries to these trees were so severe throughout the Ottawa district, both on private grounds and in the woods, as to give a rusty sickly appearance to all of the white cedars by reason of the large number of tips of young twigs which had been killed by the caterpillars boring inside them in autumn and again in the following spring after reviving. The minute caterpillars lived singly in a small twig, and each one was able to destroy a surprisingly large amount of green growth. The beautiful little moths, silvery white with brown markings, were found flying in clouds around the trees during the latter half of June.

ENTOMOLOGICAL RECORD, 1906.

By Dr. James Fletcher, Dominion Entomologist, and Arthur Gibson, Ottawa.

Judging from reports which have come to hand in connection with the Entomological Record, there has apparently been rather less enthusiasm than heretofore among collectors of insects in Canada during the past season. The personality and energy of Mr. R. V. Harvey, of Vancouver, have been effective in stirring up an unusual interest in all orders of insects in our Pacific province; and, as Secretary of the British Columbia Entomological Society, he has issued three most interesting quarterly bulletins, in which are valuable records of captures and items of entomological news, which will be useful for reference by all who take up the study of British Columbian insects. We trust that these bulletins will be continued regularly, and that all the members of the Society will see the advantage of promptly and regularly communicating to the secretary items bearing upon the provincial insect fauna.

Reports as to the nature of the season in 1906 were of a very diverse nature and were evidently much affected by local conditions. As an instance of this, the writers found sugaring for moths remarkably unremunerative at the Experimental Farm, Ottawa, while two other collectors, Mr. J. W. Baldwin, at Britannia Bay, about six miles west, and Mr. C. H. Young, at Meach Lake, fifteen miles north, noted the abundance of night flying moths at sugar. The suggested local cause affecting the question at the Experimental Farm, was that there was a remarkable outbreak of aphides on almost all kinds of trees and shrubs in the early part of the season, by which all foliage was thickly coated with honey dew, which proved more attractive to the moths than the treacle put on the trees. However, as is always the case, steady collecting was rewarded with many treasures.

Mr. J. D. Evans, at Trenton, was remarkably successful in collecting microlepidoptera in a lantern trap made as described by Mr. W. D. Kearfott.

A large number of notes of captures have been received from various parts of the Dominion, but some of the writers do not quite seem to understand what the scope of this record is, from the point of view of the present compilers. Large and complete lists of insects taken in a given locality are not desired; but merely notes on such as are of rare occurrence there, or concerning which specialists may have given interesting information in their letters. The capture of an insect beyond its recorded range or at an unusual season are records of value.

We beg gratefully to acknowledge the greater care which has been shown by several correspondents in giving exact data when these were procurable, and we would now point out that it would help materially in the preparation of Notes of Captures if correspondents, when sending in records, would put opposite each record, the number of the insect in the recognized check list of the order. This has been done by a few and is of very great assistance in making up the Record.

As in the past, we have again to express the great obligation Canadian collectors are under to the leading specialists in many orders of insects. Particular mention must be made of Dr. L. O. Howard, Dr. H. G. Dyar, and Mr. D. W. Coquillett, of Washington; Dr. J. B. Smith, of New Brunswick, N.J.; Dr. H. Skinner, of Philadelphia; Mr. W. D. Kearfott, of Montclair, N.J.; Prof. Wickham, of Iowa City; Prof. Hine, of Columbus, O., and Mr. E. P. Van Duzee, of Buffalo. All of these gentlemen have contributed largely to the exact identification of our Canadian captures during the past year. We again point out the wisdom of the greatest liberality in providing these specialists with any specimens they may desire from Canada. It is only after many years of study and collecting that they have reached the positions they now hold, of being able in a short time to name the specimens submitted to them. If at any time it is indicated that specimens would be acceptable, every effort should be put forth to discharge, in part at least and as soon as possible, the heavy debt of gratitude under which so many of us lie for past favours in the identification of material which, but for the assistance so freely given, would be comparatively useless.

During 1906 there have been a few expeditions made in Canada for the purpose of collecting insects; meagre records only of these have been received, either as to the special objects for which they were made, or as to the material collected. The officers of the Geological Survey of Canada, who in the past have collected many scarce insects from the little known regions visited by them in connection with their official work, during the past year, for one reason or another did not bring back many insects. The only collection made was a small one by Mr. L. M. Lambe in British Columbia. This is to be regretted, although the difficulties of collecting and preserving such fragile specimens as insects are well understood, and of course such collections are beyond the limits of the regular work for which most of the officers of the Geological and Natural History Survey Department go to the field. Mr. Theodore Bryant made a valuable collection of lepidoptera when engaged with the International Boundary Survey of the Alaska Coast strip. His work took him along the Taku River and the Tallsaykway, a tributary of the Taku. Messrs. George White Fraser and Robert Smith of the same survey also made a small but interesting collection chiefly Coleoptera and Hymenoptera in the Skagway District of Northern British Columbia. Messrs. R. V. Harvey and R. S. Sherman, of Vancouver, made an interesting collecting trip over the Hope Mountains from Fort Hope on the Fraser River, to Princeton on the Similkameen, a distance of 65

miles, between July 10 and 28. Many interesting lepidoptera and diptera as well as insects in other orders were collected. An account of this expedition is given in the Quarterly Bulletin of the British Columbia Entomological Society for September, 1906. Dr. Harrison G. Dyar again visited British Columbia this year, but his chief work was done with relation to mosquitoes and their habits. Mr. E. B. Williamson, of Bluffton, Inda., collected in Northern Ontario between July 29 and August 6 and secured a large amount of material. The syrphid flies (14 species) are now in the hands of Prof. R. C. Osburn, of Columbia University; and the Odonata are being worked up by Mr. Williamson and Dr. E. M. Walker. Mr. C. H. Young, of Ottawa, spent the summer at Meach Lake, Que., in the Laurentian Mountains, where he collected assiduously and reared many specimens from larvæ. He was particularly successful in collecting microlepidoptera, and set up in his characteristically exquisite manner over 1,500 specimens, all of which may be described as perfect. Mr. G. A. Moore, of Montreal, made a large collection of hemiptera at Como, Que., a complete list of which will appear at an early date in the *Canadian Entomologist*. In the present record, notes will be found of a few other insects taken by Mr. Moore at the same time. The Montreal collectors have had regular meetings and excursions, and, in addition to the work of the Montreal Branch of the Entomological Society of Ontario, the recently organized Mount Royal Entomological Club has done good work and has published a small pamphlet, Nos. 1 and 2, of proceedings. The Ottawa entomologists have continued to work energetically in connection with the Ottawa Field-Naturalists' Club, making many expeditions. A record of their work will be found in the *Ottawa Naturalist*, which is published regularly by that club. Messrs. T. D. Jarvis and E. J. Zavitz, working with the Rev. Prof. Bethune at the Ontario Agricultural College, have created much interest in entomology among the students. Mr. Jarvis has specialized on galls and gall insects and has accumulated a large collection. Mr. Zavitz has directed his attention chiefly to forest insects, and both will be pleased to hear from correspondents in all parts of Canada concerning these important branches of entomology. In Nova Scotia excellent work has been done by Mr. John Russell, of Digby, N.S., who has added many species to those already recorded from the Maritime Provinces. Mr. Joseph Perrin, of Halifax, has also added to his previous laurels by collecting many rare species. Among those whose names are well known for the work they have done in connection with Canadian entomology, vigorous work has been continued during the past season in their various localities, by the Rev. G. W. Taylor, of Wellington, B.C., who continues his studies of the geometridæ, and who, although absent for the greater part of the summer on the Dominion Fishery Commission, has found time to name many collections which have been sent to him for identification. Mr. J. W. Cockle at Kaslo has added largely to his collection of Kootenai insects, and Mr. A. H. Bush, of Vancouver, has collected throughout the season and added several new names to the local list. In the foothills of the Rockies, Messrs. Thomas Baird, of High River, F. H. Wolley-Dod and F. A. Hudson, of Millarville, have done good work in unravelling difficulties connected with their interesting western fauna. In the Okanagan Valley Mr. E. P. Venables has made useful observations, in the prosecution of which he is now aided by his friend Mr. E. S. Wilmot, who has already taken some rare species, not previously recorded from the district. Mr. T. N. Willing has collected energetically in many parts of Saskatchewan and has accumulated much material in all orders. These are being worked up and will form a nucleus for a reference museum in connection with the Provincial Department of Agriculture, which will be of inestimable value

to farmers and others. In Manitoba Messrs. Criddle, Heath and Marmont have continued their work enthusiastically and have added very much to our knowledge of the insects of that province.

Literature.

Among the many valuable works, reports and separate papers of interest to Canadian students of insects, which have been received during the past year, special mention may be made of the following:—

Cary, Merritt. The Diurnal Lepidoptera of the Athabasca and MacKenzie Region. (Proc. U. S. N. M., Vol. XXXI, pp. 425-457). This paper will be of special value to our western members. It gives as complete a list as can as yet be compiled. The facts are taken from published lists and also from the collections of the author while making a biological exploration in the north during the summer of 1903, and of Mr. E. A. Preble in 1903 and 1904. Other species will doubtless be added to this list, but it is an excellent starting point for future work. Great care has evidently been taken to give full credit to all who have done anything, however little, in working up the diurnals of this little known region.

Casey, Thos. L. Observations on the Staphylinid Groups, *Aleocharinæ* and *Xantholinini*, chiefly of America. (Trans. Academy of Sciences of St. Louis, pp. 125 to 434.) Coleopterists will note with great pleasure that Major Casey is again at work in the Staphylinidæ, a group of insects in which he has done such magnificent work. The present monograph covering particularly the two extremely difficult sub-families mentioned, will give a stimulus to North American collectors who have required just such a revision as is now provided to work up their material.

Felt, E. P. Insects Affecting Park and Woodland Trees. (Memoir VIII, N. Y. State Museum; 4to, Albany, 1905, pp. 332, plates 48, 20 coloured.) This sumptuous volume is printed on the best of paper, and everything is carried out as well as can be done by skilful printers and binders, a fit setting for the care and skill devoted to its preparation by Dr. Felt and his assistants. It brings together the results of many years' work and is supplementary to Dr. Packard's Forest and Shade-tree Insects. The letterpress is well prepared so as to be of the greatest use to the large number who will consult this work, but who are not trained entomologists. The entomologist, however, will also find that much care has been exercised in the identification of all species mentioned and in working up accurately the life-histories presented. The plates are of unusual beauty; Dr. Felt seems to have the same ideal as actuated Sir Edwin Landseer, who never portrayed in his pictures any animal that was not a thoroughbred or which was not in the best of condition. Dr. Felt's insects, even when reproduced by photography, are not only perfect, but have been set and prepared for reproduction with the greatest care. Some of the plates illustrating moths are probably unsurpassable in this respect.

Fernald, Henry T. The Digger Wasps of North America and the West Indies belonging to the sub-family Chloroninæ. (Proc. U. S. N. M., Vol. XXXI, pp. 291-423, 5 plates.) Dr. Fernald has brought a well-trained mind to bear upon the difficult task which he set himself and has done his work in such a way as to deserve the thanks of all hymenopterists. All the extensive collections in the United States have been examined, and all types so far as known have been studied. It is to be hoped that more students will devote themselves to these interesting insects now that this further help has been added to existing literature.

Folsom, J. W. Entomology with Special Reference to its Biological and Economic Aspects. (P. Blakiston's Son & Co., Philadelphia, 485 pp., with five plates (one coloured) and 300 text figures, $3.00.) The number of works in the entomologist's working library is already very large, but few active workers will be able to do without Dr. Folsom's recently issued magnificent work. In Packard's Guide, Comstock's Manual, and Kellogg's American Insects, classification is the prevailing idea, and is most useful and necessary; but in the present work the main object has been to supply in a concise form biological data. Familiar insects are used and the work is copiously illustrated with figures of the highest class. A short chapter on Classification, consisting of only 26 pages, begins the work. This, it may be thought, might have been extended to possibly twice its length with advantage. Chapter 2 on Anatomy and Physiology treats the subject in a delightful and fascinating manner. The same may be said of the next chapter on Development, in which typical insects only are dealt with in a suggestive manner. The titles of the remaining chapters are well chosen and the subjects effectively treated. They will be read with the greatest pleasure by all. Adaptations of aquatic insects, Colour and Coloration, Insects in relation to plants and to other animals, The Inter-relations of Insects, and Insects in relation to man, are subjects well dealt with in a concise and plain way, which can be understood by students. We believe that this work will do much to render the science of entomology much more popular than it must be acknowledged it has been in the past among students of agricultural colleges and others, notwithstanding the enormous economic importance of the subject, as shown by the annual losses in staple crops.

Packard, A. S. Monograph of the Bombycine Moths of North America, Part II, Ceratocampidæ. (Memoir IX, National Academy of Sciences, Washington, D.C., 1905, 4to, pp. 149, 61 plates, 24 coloured.) This is a most valuable work, giving full life-histories of the Ceratocampid moths of North America. The subject is treated of in Dr. Packard's masterly manner, and the plates, which are most beautiful, have been drawn by Messrs. J. Bridgham and L. H. Joutel, or are reproduced from photographs by Mr. A. H. Verrill. In looking through this work, we are sadly reminded that Dr. Packard's death removes one whose name has been such a watchword for good work in American entomology and takes a shining light from the ranks of the leading American scientific men who have done so much to uphold the standard of scientific excellence on this continent. The coloured illustrations, which are chromolithographs by A. Hoen & Co., of Baltimore, are simply exquisite, and the whole work supplies one of the most beautiful additions to the literature of the Lepidoptera of North America which has ever appeared. It is to be hoped that the National Academy may authorize Dr. Harrison G. Dyar or some of the many other accomplished lepidopterists of the United States to give to the public similar Memoirs upon other North American moths.

Smith, J. B. Explanations of the Terms used in Entomology. (Published by the Brooklyn Entomological Society, Brooklyn, N.Y., price $2.00.) This most useful work, which perhaps answers more exactly to the trite expression that "it fills a long-felt want" than any recent publication, will provide many entomologists with a handy book of reference, which will enable them to understand the many useful, but in many instances unnecessary, unfamiliar terms which they frequently find in reading books dealing with the study of insects. This volume contains over 150 pages and explains between four and five thousand terms of more or less frequent use. One cannot read a page without feeling that many words have been made

use of by writers without any special need, and in some instances with the result of bewildering the reader without any compensating advantage. Four plates at the end of the work show structural details of the external body wall of some typical insects and the best known colours. As plates were given at all, it seems almost a pity that one or two more were not added, particularly one showing the markings and venation of the noctuidæ and some other orders in which Dr. Smith is the recognized authority. This handy little glossary will be found indispensable to all college students and other extensive readers of entomological literature.

The following is a list of the names and addresses of collectors heard from during 1906:—

Anderson, E. M., Prov. Museum, Victoria, B.C.
Baird, Thomas, High River, Alta.
Baker, Arthur, Harding Hall College, London, Ont.
Baldwin, J. W., 74 Besserer Street, Ottawa, Ont.
Bethune, Rev. Prof., O. A. C., Guelph, Ont.
Bryant, Theo., 2044 3rd Ave. W., Vancouver, B.C.
Bush, A. H., 1105 Ninth Ave., Vancouver, B.C.
Chagnon, Gus., Box 186, Montreal, Que.
Cockle, J. W., Kaslo, B.C.
Cosens, A., Jamieson Ave., Coll. Inst., Toronto, Ont.
Criddle, Norman, Treesbank, Man.
Denny, Edward, 200 Mitcheson St., Montreal.
Dod, F. H. Wolley-, Millarville, Alta.
Draper, R., Mt. Pleasant, Vancouver, B.C.
Evans, J. D., Trenton, Ont.
Fyles, Rev. T. W., Levis, Que.
Garrett, C., Galgary, Alta.
Gibbon, Hugh, Miniota, Man.
Grant, C. E., Orillia, Ont.
Hahn, Paul, Roxborough Ave., Toronto.
Halkett, A., Fisheries Museum, Ottawa.
Hanham, A. W., Duncans, B.C.
Harrington, W. H., P. O. Dept., Ottawa.
Harvey, R. V., Queen's School, Vancouver, B.C.
Heath, E. F., Cartwright, Man.
Hudson, A. F., Millarville, Alta.
Jarvis, T. D., O. A. C., Guelph, Ont.
Jones, W. A. Dashwood-, New Westminster, B. C.
Keele, Jos., Geological Survey, Ottawa.
Keen, Rev. J. H., Metlakatlah, B.C.
Lambe, L. M., Geological Survey, Ottawa.
Lyman, H. H., 74 McTavish St., Montreal.
McIntosh, W., Nat. His. Soc'y., St. John, N.B.
Marmont, L. E., Rounthwaite, Man.
Metcalfe, W., 288 Bank Street, Ottawa.
Mitchell, Arch., Dep. of Agriculture, Edmonton, Alta.
Moore, W. H., Scotch Lake, N.B.
Moore, G. A., 209 Prince Arthur St., Montreal.
Perrin, Jos., McNab's Island, Halifax, N.S.
Russell, John, Digby, N.S.
Sanson, N. B., Banff, Alta.
Saunders, Henry, 21 Harbord St., Toronto.
Sherman, R. S., 2285 Sixth Ave., Vancouver, B.C.

Simpson, Willibert, Dom. Observatory, Ottawa.
Stevenson, Chas., 906 St. Urbain St., Montreal.
Taylor, Rev. G. W., Wellington, B.C.
Venables, E. P., Vernon, B.C.
Walker, Dr. E. M., 99 St. George St., Toronto.
Wallis, J. B., Office of Sup. Schools, Winnipeg, Man.
Williams, J. B., 236 Bloor St. E., Toronto, Ont.
Willing, T. N., Regina, Sask.
Wilmot, E. S., Vernon, B.C.
Wilson, W. J., Geological Survey, Ottawa.
Winn, A. F., 132 Springfield Ave., Westmount, Que.
Young, C. H., Hurdman's Bridge, Ont.
Zavitz, E. J., O. A. C., Guelph, Ont.

NOTES OF CAPTURES.

Lepidoptera.

(Arranged according to Dyar's List of North American Lepidoptera, U. S. N. M. Bull. No. 52.)

RHOPALOCERA.

(Dyar's number.)

51. *Callidryas philea*, L. St. John, N.B., Sep. 17, perfect specimen taken on dahlia blossoms, (McIntosh). This is the first Canadian record of this southern insect.
70. *Eurymus alexandra*, Edw., b. *emilia*, Edw. Kaslo, B. C., male and female seen but not captured, Aug. 19, (Cockle); Kalso, July 22, 1897, (Danby).
92. *Euptoieta claudia*, Cramer. Westmount, Que., one specimen seen Sept. 8, (Winn).
207. *Polygonia satyrus*, Edw. St. John, (McIntosh). The form *marsyas* was taken at Digby, N.S., by Mr. J. Russell.
223. *Junonia cœnia*, Hbn. Orillia, Ont., second specimen taken here, July, (Grant).
264. *Cercyonis œtus*, Bdv. Tranquille, B. C., July 7, (Lambe).
374. *Incisalia irus*, Godt, var. *arsace*, Bdl-Lec. Digby, N. S., 4 sps., May 5 to 22, (Russell).
383. *Erora læta*, Edw. Digby, June 7, (Russell).
463. *Amblyscirtes samoset*, Scudd. MacNab's Island, Halifax, N.S., quite abundant, (Perrin).

HETEROCERA.

661. *Lepisesia juanita*, Strk. A male in perfect condition, hovering over a thistle head in hot sunshine near Red Deer River, about 50 miles north-east of Gleichen, on July 6, 1905; agrees with Strecker's description, and is apparently the first record for Canada, (Dod).
674. *Argeus labruscæ*, L. St. John, Aug. 25, at light, (McIntosh). This is the only known Canadian record of this magnificant southern hawk moth.
704. *Sphinx luscitiosa*, Clem. Digby, N.S., July 15, 16, (Russell); Aweme, Man., May 27, June 10, 17, (Criddle). Montreal, July 17, (Can Ent. 38, p. 59).

778. *Basilona imperialis*, Drury. Ross Mount, Ont. Two perfect specimens, male and female, of this handsome moth, which is rare in Canada, were recently taken at the above place by Mr. T. W. Ramm, and presented to the Division of Entomology.
846. *Ecpantheria deflorata*, Fab. Niagara Glen, Ont., two larvæ, Sept. 18 and 20, one found feeding on violets, (Williams).
859. *Isia isabella*, S. & A. Kaslo, July 16, 2nd specimen taken by me here, the 1st in 1891, (Cockle).
875. *Apantesis virguncula*, Kirby. Milton, N.S. July 6, (W. H. Moore).
880. *Apantesis anna*, Grt. Niagara Glen, (Hahn).
961. *Demas propinquilinea*, Grt. MacNab's Island, Halifax, Feb. 11, (Perrin).
964. *Charadra deridens*, Gn. This handsome noctuid has this year been reported from several localities: Cartwright, Man., June 15, (Heath); Ottawa, June 22, (Young); June 4, (Fletcher); Digby, June 23, (Russell).
1,006. *Apatela tritona*, Hbn. MacNab's Island, Halifax, July 2, (Perrin).
1,008. *Apatela funeralis*, Grt. St. John's, Que., July 1, (Chagnon); Ottawa, (Young, Fletcher); Toronto, (Gibson).
1,149. *Hadena bridghami*, G. & R. Digby, Aug. 22, (Russell). St. John Aug. 20, (McIntosh).
1,153. *Hadena claudens*, Wlk. Kaslo, Aug. 28, (Cockle); Aweme, Man., Aug. 24, (Criddle & Fletcher).
Hadena ferens, Sm. Calgary, Alta., at light, July, 12, (Hudson).
1,189. *Hadena barnesii*, Sm. Kaslo. July 28, (Cockle).
1,212. *Hadena passer*, Gn. Digby, July 9, (Russell); Kaslo, July 21, (Cockle).
Hadena rorulenta, Sm. MacNab's Island, Halifax, July 5, (Perrin); Ottawa, June 23, (Young); Digby, June 29, (Russell).
1,228. *Hadena plutonia*, Grt. Meach Lake, July 17, (Young). First record for the Ottawa district.
1,230. *Hadena ducta*, Grt. Massett, Q. C. I., July 9, (Keen).
1,298. *Heliotropha obtusa*, Sm. Aweme, Aug. 19, (Criddle). Described from New Hampshire; never saw it since, (J. B. Sm.).
1,312. *Homohadena badistriga*, Grt., var. *fifia*, Dyar. Kalso, July 3, (Cockle).
1,345. *Oncocnemis glennyi*, Grt. Vernon, (Bush).
1,356. *Oncocnemis barnesii*, Sm. Kaslo, Aug. 19, (Cockle). The third known specimen.
1,359. *Oncocnemis balteata*, Sm. Aweme, Aug. 11, 22; Sep. 1, (Criddle). A rare and beautiful species.
1,390. *Rhynchagrotis rufipectus*, Morr. Ottawa, Aug. 9, (Young).
1,429. *Semiophora youngii*, Sm. Digby, N.S., Aug. 28, (Russell).
1,477. *Noctua esurialis*, Grt. Vancouver, B.C., July 20, (Bush).
1,480. *Noctua conchis*, Grt. Regina, Sask., July 11, (Willing).
1,484. *Noctua phyllophora*, Grt. Ottawa, June 22, (Fletcher); Digby, July 7, Aug. 3 (Russell); MacNab's Island, Halifax, July 15, 20, (Perrin).
1,492. *Noctua juncta*, Grt. Millarville, Alta., July 17, (Hudson).
1,560. *Pronoctua typica*, Sm. Kaslo, Sept. 9, (Cockle).
1,530. *Rhizagrotis albicosta*, Sm. High River, (Baird).
1,531. *Rhizagrotis flavicollis*, Sm. High River, Alta., (Baird).

1,533. *Rhizagrotis lagena*, Grt. A pair on Red Deer River, July 1 and 3, at snowberry flowers at dusk, (Dod & Hudson).

Paragrotis maimes, Sm. Calgary, common at light in early August; scarce for years past, (Dod & Hudson); High River, (Baird).

Paragrotis vestitura, Sm. Can. Ent. XXXVII., p. 20. St. John, usually rather abundant in August. It was from my specimens that Dr. Smith described the species, (McIntosh). McNab's Island, Halifax, Aug. 12, (Perrin).

1,579. *Paragrotis plagigera*, Morr. Spatsum, B.C., July 26, (Bush).

1,611. *Paragrotis acornis*, Sm. Calgary, Sep. 19, one at light, (Dod); High River, (Baird).

1,623. *Paragrotis detersa*, Wlk. The white larvæ almost identical in appearance with those of *Paragrotis scandens* were common around clumps of *Salsola Kali* and *Cakile Americana* on the sandy beach at Youghall, N.B., in July, (Fletcher).

1,697. *Paragrotis dissona*, Moschler. Banff, Aug. 10, (Sanson); Field, B. C., July 24, (Bush).

1,721. *Paragrotis furtivus*, Sm. Vancouver, July 11, (Bush); High River, (Baird).

1,731. *Paragrotis acutifrons*, Sm. Cartwright, July 17, one at sugar, (Heath).

1,732. *Paragrotis nordica*, Sm. Cartwright, July 11 and 17, at sugar, (Heath).

1,785. *Mamestra distincta*, Hbn. Meach Lake, Que., May 16, (Young).

1,788. *Mamestra liquida*, Grt. Kaslo, June 27, (Cockle).

1,804. *Mamestra larissa*, Sm. Aweme, June 3, (Criddle). *Teste* Dod.

1,806. *Mamestra rubefacta*, Morr. Digby, June 18, (Russell).

1,808. *Mamestra cristifera*, Wlk. Meach Lake, July 10, (Young).

1,809. *Mamestra assimilis*, Morr. Ottawa. Four mature larvæ found feeding on common St. John's-wort, *Hypericum perforatum*, Sept. 22, 1905. Emerged June 7, 1906, (Gibson).

1,851. *Mamestra pensilis*, Grt. Aweme, July 6 and 26, (Criddle). *Teste* Dod.

Mamestra obesula, Sm. Calgary, a few at light, July 12 to 25, (Dod & Hudson); Rosthern, Sask., July 21, (Willing).

1,882. *Barathra curialis*, Sm. This interesting species, which was so abundant in Canada during 1905, and which was mentioned in last year's Entomological Record, under the name *Barathra occidentata*, Grt., has again appeared in small numbers in some localities. Mr. Lyman and Mr. Winn report having taken it at Montreal in June; and Mr. Perrin, of MacNab's Island, Halifax, captured it on June 25, 27, and July 4.

1,906. *Scotogramma submarina*, Grt. About 8 specimens at snowberry flowers, at dusk, on Red River, July 1-4, (Dod & Hudson).

1,910. *Scotogramma uniformis*, Sm. Field, July 25, (Bush); Banff, July 16, (Sanson).

1,918. *Scotogramma conjugata*, Sm. Vancouver, taken from a railway car, July 7, (Bush).

1,941. *Anarta zetterstedti*, Staud. Field, B.C., July 25, (Bush).

1,965. *Heliophila diffusa*, Wlk. Aweme, June 17, (Criddle). *Teste* Dod.

2,000. *Orthodes irrorata*, Sm. Vancouver, June 29, July 16, (Bush).

2,042. *Graphiphora rubrescens*, Wlk. Ottawa, April 23, 25, (Young).

Fishia exhilarata, Sm. Kaslo, Oct. 10, (Cockle).

2,077. *Lithomoia germana*, Morr. Kaslo, Aug. 25; a new record for the interior of British Columbia, (Cockle).

2,086. *Xylina hemina*, Grt. Aweme, Apl. 23, and Sept., (Criddle). *Teste* Dod.

2,096. *Xylina amanda*, Sm. Aweme, Sept. 19, Oct. 1, (Criddle). *Teste* Dod; Miniota, Man., (Gibbon).

2,107. *Xylina tepida*, Grt. MacNab's Island, Halifax, Apl. 17, (Perrin); St. John, (McIntosh).

2,113. *Xylina capax*, G. & R. Cartwright, (Heath). *Teste* Dyar.

Xylina fletcheri, Sm. Meach Lake, Sept. 6, 7, (Young).

2,168. *Gortyna medialis*, Sm. Calgary, a worn male at light, Sep. 19, very rare of recent years, (Dod).

Gortyna pallescens, Sm. Kalso, Aug. 25, the only specimen taken since 1892, (Cockle). It is possible that Mr. Dod's specimen should be referred here.

2,175. *Papaipema harrisii*, Grt. var. Reared in some numbers from larvæ boring in the base of fronds of *Pteris aquilina*, Meach Lake, Aug., (Young). These larvæ were much parasitised.

2,191. *Papaipema appassionata*, Harvey. Reared from the roots of *Sarracenia purpurea*, Meach Lake, Aug., (Young). Many larvæ parasitised by *Masicera myoidea*. This most beautiful species is still very rare in collections.

2,213. *Tapinostola orientalis*, Grt. Calgary, two specimens at light, Sept. 8, (Hudson).

2,284. *Tapinostola variana*, Morr. Meach Lake, one specimen, July 7, (Young). A new record for Ottawa district.

2,473. *Polychrysia formosa*, Grt. MacNab's Island. Halifax, Aug. 17, (Perrin); St. John, July 19, (McIntosh).

2,516. *Autographa surena*, Grt. Quebec, Que., Aug. 12, 1902, (Hahn).

2,501. *Autographa alias*, Ottol. Dr. Ottolengui writes, "this species is found in nearly all collections under the name of *u-aureum*, a European species, the description of which does not fit anything in this country." Specimens have been received from St. John, (McIntosh); Halifax, (Perrin), and Ottawa, (Young).

2,503. *Autographa altera*, Ottol. McNab's Island, Halifax, (Perrin). Dr. Ottolengui writes: "The type of *altera* came from Nepigon, and I have a second specimen from the Adirondacks. Mr. Perrin's is the third. I am much interested in this specimen, because, being grayer than mine, it looks more like *variana*, but, placed between the types of these two species, which Dr. Dyar thought would prove to be the same, the specimen only emphasizes the fact, that both are species.

2,514. *Autographa celsa*, Hy. Edw. Vancouver, July 29, (Bush).

2,522. *Autographa excelsa*, Ottol. Sable Island, Aug. 19, 1899, (John Macoun). "I have been told that this species is not separable from *angulidens*, described from Colorado; but I have had over a hundred specimens of that before me, and every one has the silver mark with prolongations close together, and turned inwardly forming a U. I took my first *excelsa* in New Hampshire, and received others from Wolley-Dod, of Calgary. All that do not come from Colorado, have thus far had the typical V instead of the U silver mark. The genitalia also differ. You may feel safe in calling anything like this from Colorado, *angulidens*, as it seems as local as *vaccinii*. All others are *excelsa*." (R. Ottolengui.)

2,781. *Syneda graphica*, Hbn. Hope Mts., B.C., July 17, (Harvey).

2,872. *Catocala cerogama*, Gn. Cartwright, Aug. 18 and 20, one each night; this is, I think, a record for Manitoba. (Heath).

2,886. *Catocala cælebs*, Grt. Digby, Aug. 14, (Russell).

2,990. *Homoptera minerea*, Gn. White River, Hudson Bay slope, June 2, (W. J. Wilson).

3,007. *Thysania zenobia*, Cram. Toronto, Sep. 19, (Hahn). This is the second record of this magnificent visitor from the South being taken in Canada.

3,150. *Schizura scmirufescens*, Wlk. Vancouver, taken from railway car, July 28, (Bush); Cartwright, June 17, (Heath).

3,169. *Gluphisia lintneri*, Grt. Calgary, a male flying in sunshine, Apl. 19, (Hudson); Aweme, Apl. 18, 25, (Criddle); Ottawa, var. *arimacula*, Huds., May 23, (Young).

3,197. *Euproctis chrysorrhœa*, L. St. John, N.B., July 22, 1904, (A. Gordon Leavitt). The second Canadian record.

210. *Tolype distincta*, French. Kaslo. Aug. 17, (Cockle).

225. *Eudeilinea herminiata*, Gn. One on July 5, on Red Deer River, (Dod).

3,233. *Cysteropteryx viridata*, Pack. Meach Lake, May 17, (Young).

3,259. *Carsia paludata*, Thunb. Hope Summit, 5,800 feet, July 19, (Harvey).

3,287. *Eupithecia latipennis*, Hulst. Meach Lake, June 15, (Young).

3,276. *Eupithecia ornata*, Hulst. Ottawa, Apl. 24, May 4, (Young)

Eupithecia youngata, Taylor. Ottawa, June 7, July 20, (Young). This species was described in the "Ottawa Naturalist" for March, 1906.

Eupithecia casloata, Dyar. Meach Lake, Aug. 5, (Young).

3,350. *Eustroma propulsata*, Wlk. (*R packardata*, Lint.), a variety with antennæ dentate and probably in process of evolution towards a pectinated form. The ordinary form is simple ciliate. Frazer Falls, Y.T., Aug. 22, 1905, (J. Keele).

3,362. *Rheumaptera luctuata*, D. & S. a. *obductata*, Moesh, Lansing River, Y.T., June 24, (Keele).

3,425. *Cœnocalpe polygrammata*, Hulst. A pair on Red Deer River, July 3 and 6, (Dod & Hudson). The first records for Canada, (G. W. Taylor).

3,695. *Cymatophora brunneata*, Thunb. Hope Mts., July 20, (Harvey).

3,709. *Cymatophora latiferrugata*, Wlk. Ottawa, emerged from pupa, Aug., larva on *Prunus pennsylvanica;* black, with conspicuous white spots on sides, (Fletcher). A distinct species from *C. pustularia*.

3,734. *Cymatophora denticulodes*, Hulst. Two males at light on Pine Creek, July 22 and 25, (Dod). Hope Mts. July 18, (Harvey). New to Canada. (G. W. Taylor.)

3,773. *Platea trilinearia*, Pack. Not uncommon on Red River bottom, north-east of Gleichen, amongst prairie sage, *Artemisia ludoviciana*, in early July, (Dod & Hudson). Mr. Taylor says that this species was not previously known from Canada, with the exception of a possibly erroneous "B.C." record.

3,902. *Sicya macularia*, Harr. Sturgeon River, West of the Tamagami Region, July 17, (W. J. Wilson).

3,909. *Therina athasiaria*, Wlk. Meach Lake, June 17, (Young). The first record for the Ottawa district.

4,266. *Glaphria psychicalis*, Hulst. Trenton, one specimen, July 12, (Evans).
4,308. *Sylepta penumbralis*, Grt. Trenton, 4 specimens at light, May 17, Aug. 12, (Evans).
4,321. *Diaphania quadristigmalis*, Gn. Toronto, (Hahn).
4,323. *Metrea ostreonalis*, Grt. Meach Lake, July 16, very rare, (Young).
4,386. *Tholoria reversalis*, Gn. McNab's Island, July 10, 1904, (Perrin).
4,414. *Cindaphia bicoloralis*, Gn. Trenton, Aug. 20, at light, Evans).
4,455. *Pyrausta generosa*, G. & R. Trenton, at light, May 27, (Evans).
Eurrhypara urticata, L. Milton, N.S., July 6, 1906, (W. H. Moore). This common European species which feeds upon the stinging-nettle was first found by Mr. Moore, and was kindly identified by Dr. H. G. Dyar, who reported, "not known in North America." Since the receipt of Mr. Moore's specimens I have had an opportunity of examining Mr. Wm. McIntosh's collection in St. John, N.B., where I found several specimens of this moth. Mr. McIntosh tells me it is common in the district.
4,496. *Nymphula obliteralis*, Wlk. Trenton, 2 specimens, (Evans).
4,499. *Elophila bifascialis*, Rob. Trenton, 3 specimens, Aug. 14, (Evans).
4,519. *Herculia cohortalis*, Grt. Trenton, June 30, Aug. 6, (Evans).
4,544. *Schœnobius tripunctellus*, Rob. Trenton, one specimen, June 25, at light, (Evans).
5,014. *Exartema zellerianum*, Fern. Trenton, July 19, (Evans).
Eucosoma confluana, Kearf. Trenton, one specimen, at light, Aug. 24, (Evans).
5,287. *Ecdytolopha insiticiana*, Zell. Trenton, 2 specimens, June 25, and Aug. 24, at light, (Evans).
5,336. *Cenopis Pettitana*, Rob. Trenton, (Evans); Ottawa, larva on basswood, May 31; pupa, June 7; moth, June 16, (Gibson).
5,419. *Eulia quadrifasciana*, Fern. Trenton, two specimens, July 8 and 22, at light, (Evans).
5,818. *Gelechia ornatifimbriella*, Clem. Trenton, at light, June 25, and July 7, (Evans).
5,865. *Depressaria psoraliella*, Walsm. Trenton, one specimen, at light, Sept. 5, (Evans).

The following valuable notes on some species of microlepidoptera have been received from Mr. W. D. Kearfott, and are gratefully included:

"Since the brief list of notable captures was written for the 1904 Entomological Record, I have had the privilege of examining a very large number of Canadian specimens, and mention the following as being especially interesting. Several of them are new records for Canada.

"This list could be continued almost indefinitely, but its usefulness is limited, because there is no strictly Canadian list of Lepidoptera. I would strongly urge the compilation of such a list. With such a basis to work from, the friendly rivalry to add names to it would be very much stimulated. I have records of several hundred names of Microlepidotera, and my notes and help are freely offered to any one who may care to undertake this task.

"I desire again to extend my sincere thanks to the gentlemen who have so kindly sent me their material for examination and determination, and for their most generous treatment in the cases of unknown and desirable species, especially Messrs. Young, Criddle, Marmont, Heath, Evans, Willing, Dennis, Taylor, Saunders, Winn, Gibson and Fletcher.

4,569. *Crambus bidens*, Zeller. Specimens of both sexes from Mr. Young, Ottawa, July 11. Very rare as yet in general collections.

4,583. *Crambus myellus*, Hbn. Hurdman's Bridge, Ont., July 26-30. This species is recorded from Europe, Maine and Nova Scotia. It is very rarely met with, and Mr. Young's specimens are the first I have seen.

5,137½. *Eucosma suffusana*, Zell. This European species has never been recorded from America, but is likely to prove of considerable economic importance after a few years. I have recently received specimens for determination from several localities in New Jersey and Pennsylvania, Portsmouth, N.H., and Regina, Sask., (Willing), August 15. Early this spring I bred the moths from larvæ crumpling and rolling the young leaves of my rose bushes and eating the entire bud. The larva is transparent pinkish green, almost slug-like in shape. I have not had it from Eastern Canada; but it will be found wherever roses grow.

5,189. *Thiodia signatana*, Clem. Received from Mr. Gibson, and labelled "Miner in maple leaves, Kirk's Ferry, issued Sept. 18." This species is quite common in Montclair and, during June, can be found in abundance on the trunks of the red maple.

The larvæ are found in September, living in a tube on the underside of the leaf, and still further protected by a web of silk across the leaf, from edge to edge. It would be interesting to know if its habits are different at Kirk's Ferry; possibly the term "Miner" referred only to the young larvæ, immediately out of the ova.

5,298. *Carpocapsa toreuta*, Grote. One specimen received through Dr. Fletcher, labelled "Bred from cone of *Pinus ponderosa*, British Columbia (Interior), (J. R. Anderson)." This is another very rare species; only one or two other specimens are known.

5,325. *Acleris angusana*, Fern. Hurdman's Bridge; bred from larvæ webbing the leaflets of hemlock. Mr. Young sent me eight specimens, exhibiting a great range of variability; a narrow band from base to apex connects them all; but this band ranges from pure white, through the reds to black. The ground color, likewise, in different specimens, ranges from pale yellow, through the reds to purplish black, and in some of the specimens a white transverse angulated band through the middle of the wing; in others, the outer half is paler than the inner. On p. 849, Fifth Report Ento. Comm., Packard records the breeding of this species from spruce and fir, but calls it Var. "E" of *Teras variana*, Fern.

5,475. *Carposina crescentella*, Wlsm. Hurdman's Bridge, (Young); locality "unknown" in Dyar's list; it has also been taken in Western Pennsylvania, (Merrick).

5,488. *Periclymenobius canariellus*, Wlsm. Hurdman's Bridge, (Young); Rounthwaite, (Marmont). The three species under this genus can easily be recognized by the scythe-like extension of the cilia of the apex of the fore wings, making them veritable hook-tips; I believe all three will be found in Canada from Ottawa westward. I have already recorded *P. frustellus* from Aweme, (Criddle), and Cartwright, (Heath), and also have *canariellus* from Wellington, B.C., (Taylor) and Arizona, (Kunze).

5,918. *Euclemensia bassettella*, Clem. Hurdman's Bridge, (Young).

This is one of the most beautiful of the larger Tineids, a long bar of crimson on an opalescent-black back-ground. It has been

bred from larvæ feeding within small yellowish brown, shining galls on twigs of oak. I do not believe this larva is the cause of the gall, but it makes use of the habitat of a generous (?) Dipteron.

ADDITIONS TO THE MANITOBA LIST.

4,521. *Herculia olinalis*, Gn. Aweme, VII., 26 to VIII, 6.
4,566. *Crambus unistriatellus*, Pack. Aweme, VIII, 17.
4,737. *Nephopteryx hypochalciella*, Rag. Aweme VIII, 16.
4,871. *Homœosoma mucidellum*, Rag. Aweme, VI., 12.
4,965. *Pterophorus subochraceus*, Wlsm. Aweme, VI., 12.
5,018. *Exartema versicolorannum*, Clem. Aweme, VII, 12-15.
5,022. *Exartema corylanum*, Fern. Aweme, VII., 6-12.
5,071. *Olethreutes bipartitana*, Clem. Aweme, VI, 21 to VII, 5.
5,073. *Olethreutes impudens*, Wlsm. Aweme, VII., 27.
5,132. *Eucosma hirsutana*, Wlsm. Aweme, VI., 14 to VII., 4.
5,150. *Eucosma carolinana*, Wlsm. Cartwright.
5,255. *Ancylis divisana*, Walk. Aweme, VI., 26-27.
5,274. *Enarmonia lunatana*, Wlsm. Aweme, V, 18 to VI, 7.
Ancylis cockleana, Kearf. Aweme, VII., 20.
5,339. *Cenopis groteana*, Fern. Winnipeg, Hanham.
5,407. *Tortrix packardiana*, Fern. Aweme, VI., 12.
5,834. *Stenoma schlœgeri*, Zell. Aweme, VI, 21.
5,912. *Ethmia longimaculella*, Cham. Aweme, VI., 21.
6,108. *Scythris eboracensis*, Zell. Aweme, VI., 27 to VII., 7.

W. D. K.

The following species of geometridæ have been described in the "Canadian Entomologist" for 1906, by the Rev. G. W. Taylor, of Wellington, B.C., from different parts of Canada.

Eupithecia regina. Regina, Sask., June 25, (Willing); Calgary, June 29, July 7, to Aug. 8. (Dod).

Eupithecia alberta. Calgary, June 30, (Dod).

Eupithecia dodata. Calgary, June 26, and July 3, (Dod).

Eupithecia adornata. Calgary, May 25, to June 14, (Dod).

Xanthorhoe circumvallaria. Millarville, June 26, July 24, (Dod).

Aplodes hudsonaria. Fifty miles N.E. of Gleichen, Alberta, July 7, (Hudson); Victoria, August, 1903, (Hanham).

Eupithecia olivacea. Wellington, April 7, 1903, (Taylor); not uncommon at Vancouver (Harvey).

Eupithecia harveyata. Vancouver, Apl. 6, 1903, (Harvey).

Eupithecia dyarata. Kalso, Apl. 24, not uncommon, (Cockle).

Eupithecia hanhami. Victoria, June, (Hanham).

Eupithecia bryanti. Stickeen River, B.C., July, (Bryant).

Eupithecia obumbrata. Victoria, April to June, (Hanham).

Eupithecia modesta. Vancouver, June 6, (Taylor).

Eupithecia insignificata. Wellington, Victoria and Vancouver, March to May, (Taylor).

Euphithecia sublineata. With above, and thought to be a variety of it.

Eupithecia perbrunneata. Kaslo and Victoria, May 9 to June 2, (Cockle and Taylor).

Eucymatoge vancouverata. Wellington, Vancouver.

Eustroma harveyata. Kaslo, Stickeen River, Vancouver.

Zenophleps victoria. Victoria, (Hanham).

Hydriomena autumnalis, Strom., var. *columbiata*. Victoria, Wellington, May.

Hydriomena manzanita. Wellington, April.
Xanthorhoe pontiaria. Wellington; Salem, Oregon.
Xanthorhoe fossaria. Laggan, Alta., and Mt. Cheam., B.C., (Bush).
Leptomeris subfuscata. Victoria, (Hanham); Vernon, (Harvey).
Deilinia bryantaria. Stickeen River, June 13, (Bryant).
Enypia packardata. Wellington, June to August.

Several species of European geometridæ have been recognized in Canada, for the first time during the year, viz.

Eupithecia castigata, Hbn. Wellington, (Taylor); Calgary, (Dod).
Eupithecia togata, Hbn. Wellington, (Taylor).
Hydriomena ruberata, Freyer. Calgary, (Dod).
Himera pennaria, L. Tamarisk, Man., 1903, (L. Fanshawe).

Coleoptera.

(Arranged according to Henshaw's List of the Coleoptera of America, North of Mexico.)

36. *Cicindela cinctipennis,* Lec. Vernon, B.C., May, one specimen on damp sand, (Venables).
109. *Cychrus angulatus,* Harr. Duncans, B.C., April, (Hanham).
871. *Lebia devisa,* Lec. Regina, April 15, (Willing).
898. *Lebia depicta,* Horn. Regina, Oct. 11, (Willing).
1,487. *Dytiscus circumcinctus,* Ahr. Winnipeg, "On a sultry evening in October my son Evan collected about 100 specimens, half of them males; of the females four had sulcate elytra. Prof. Wickham who named my specimens, writes: 'The first American specimens I have seen. The original American locality is Red River, and they may have come from Winnipeg,'" (Evans).
2,661. *Boletobius cinctipennis,* Say. Aweme, in woods, April 9, (Criddle).
2,829. *Olophrum marginatum,* Kirby. Sudbury, one specimen, (Evans).
2,899. *Siagonium americanum,* Melsh. Sudbury, one specimen, (Evans).
3,696. *Epurœa helvola,* Er. Aweme, at putrid bird, June 3, (Criddle).
3,984. *Arœopus monachus,* L. Vernon, on willow blossom, (Venables).
4,005. *Holodes thoracica,* Guer. Como, Que., July, Aug., (G. A. Moore).
4,275. *Ludius abruptus,* Say. Ottawa, June 20, (Fletcher).
9,394. *Chrysobothris ludificata,* Horn. Aweme, April 10, July 16, (Criddle).
5,022. *Malachius aneus,* L. Ottawa, June 6, (Fletcher); July 1, (J. A. Guignard). An addition to the Ottawa list.
5,177. *Clerus nigriventris,* Lec. Vernon, on pine stump, July 15, (Venables).
5,359. *Dinoderus substriatus,* Payk. Barrie, Ont., in hemlock bark, Oct., (Zavitz).
5,384. *Hylecœtus lugubris,* Say. Fort Kent, Maine, 1900, opposite St. Francis, N.B., (Rev. F. X. Burque).
5,525. *Aphodius fœtidus,* Fab. Aweme, April 26, May 4, (Criddle).
5,961. *Prionus californicus,* Mots. Grierson's Wharf, on the Ottawa near Fitzroy Harbour, July 30, (Metcalfe). A wanderer from the Pacific Coast.
6,079. *Tylonotus bimaculatus,* Hald. Guelph, on black ash, July, (Zavitz).
6,106. *Ancylocera bicolor,* Oliv. Ridgeway, on hickory, Aug., (Zavitz).
6,238. *Toxotus schaumii,* Lec. Galt, on maple, August, (Dr. Bethune).
6,304. *Leptura subhamata,* Rand. Guelph, August, (Zavitz).
6,345. *Leptura biforis,* Newm. Ridgeway, August, (Zavitz).
6,385. *Monohammus titillator,* Fab. Rondeau and Ridgeway, on white pine, June to August, (Zavitz).
6,397. *Goes pulchra,* Hald. Ridgeway, on hickory, August, (Zavitz).

6,577. *Crioceris asparagi*, L. Ottawa, larvæ found Sept. 20, buried Sept. 22, emerged at end of October; the furthest eastern record in Ontario, (Fletcher & Gibson). Not previously found at Ottawa.
7,396. *Calocnemis dilaticollis*, Mann. Vernon, June, (Wilmot).
7,852. *Mordellistena bihamata*, Melsh. Como, Que., June and August, (G. A. Moore).
7,873. *Stereopalpus mellyi*, Laf. Como, July and August, (G. A. Moore).
8,101. *Epicauta fissilabris*, Lec. Saskatoon, June 6, (Willing).
8,611. *Magdalis perforata*, Horn. Ridgeway, Aug., on white pine, (Zavitz)
8,619. *Magdalis subtincta*, Lec. Greenbush, Man., bred from twigs of white spruce, March 4, (Willing).
8,634. *Anthonomus profundus*, Lec Trenton, one specimen, Sept. 27, '03. This has not been so far reported from Canada, (Evans).
9,203. *Gonotropis gibbosus*, Lec. Aweme, April 29, (Criddle).
9,748. *Cryptorhynchus lapathi*, L Ridgeway and Beamsville, June 23 to July 30, (Zavitz). Toronto, on one willow only in High Park, but this was completely riddled, (A. Cosens). This destructive weevil which attacks poplars and willows is gradually spreading through North America. These are the first Canadian records.

Diptera.

(Arranged according to a Catalogue of North American Diptera by J. M. Aldrich. Smithsonian Misc. Coll., XLVI, No. 1, 444. The numbers refer to the pages of the Catalogue.)

171. *Bibiocephala grandis*, O. S. Hope Mts., B.C., July 14, (Harvey).
196. *Chrysops delicatulus*, O. S. St. John, July 2, (McIntosh).
196. *Chrysops frigidus*, O. S. Hope Mts., July 18 to 27, (Harvey).
198. *Chrysops proclivus*, O. S. St. John, July 21, (McIntosh).
203. *Tabanus fratellus*, Will. Hope Mts, July 18 to 25, (Sherman).
Tabanus osburni, Hine. Hope Mts., July 12 to 25, abundant, (Sherman and Harvey).
209. *Tabanus zonalis*, Kby. Kaslo, (Cockle).
227. *Dipalta serpentina*, O. S. Goldstream, B.C., Aug. 19, (Harvey).
Anthrax harveyi, Hine. Hope summit, 5,800 feet, seven specimens, July 20 and 24, (Sherman and Harvey).
241. *Eclimus harrisii*, O. S. St. John, (McIntosh).
256. *Stenopogon modestus*, Lw. Similkameen, July 21, 22, common, (Sherman and Harvey).
258. *Dicolonus simplex*, Lw. Victoria, June 8, (Harvey).
259. *Cyrtopogon aurifex*, O. S. Hope Mts., July 12 to 27, common, (Sherman and Harvey).
259. *Cyrtopogon dasylloides*, Will. Kaslo, (Cockle).
296. *Hydrophorus innotatus*, Lw. St. John, (McIntosh).
383. *Pyritis montigena*, Hunter. Vancouver, Feb. to Apl., (Sherman).
386. *Eristalis inornatus*, Lw. St. John, June 5, (McIntosh).
Merodon equestris, Fab. Vancouver, several specimens, (Harvey).
401. *Crioprora alopex*, O. S. Vancouver, March 24, (Sherman).
405. *Temnostoma æqualis*, Loew. Haydon, Ont., July 31, (E. B. Williamson).
412. *Myopa pictipennis*, Will. Vancouver, April 14, (Harvey).
Cuterebra grisea, Coq. Hope Mts., July 12, (Sherman).
419. *Cuterebra tenebrosa*, Coq. Kaslo, July 20, (Cockle), Vernon, July, (Wilmot). A magnificent blue-black species nearly an inch long and almost one-half inch across the abdomen.

422. *Cistogaster immaculata*, Macq. Hope Mts., July 15, (Harvey).
466. *Masicera myoidea*, Desv. Meach Lake, bred from *Papaipema appassionata*, (Young).
527. *Mesembrina resplendens*, Wahl. Kaslo, (Cockle)..
605. *Trypeta straminea*, Doane. Wellington, July, 1904, (Harvey).
608. *Carphotricha culta*, Wied. Wellington, June, 1905, (Harvey).
611. *Tephritis albiceps*, Lw. Victoria, June 8, (Harvey).

Hemiptera.

We are glad to note an awakening of interest in this important order. Collections have been submitted to Mr. E. P. Van Duzee and kindly named by him, from Mr. W. J. Palmer, of Buffalo, the Rev. G. W. Taylor, of Wellington, B.C., and Mr. G. A. Moore, of Montreal. A list of Mr. Palmer's collection taken near Lake Temagami, Ont., appears in the *Canadian Entomologist* for 1906 at page 406. Some of Mr. Taylor's new species are described in *Entomological News* for Dec., 1906, page 388, and Mr. Moore's collection taken at Como, Que., will be published in an early number of the *Canadian Entomologist*.

The following are considered by Mr. Van Duzee of special interest: —

HETEROPTERA.

Sehirus cinctus, P. B. Como, July 24, one specimen, (Moore).
Banasa dimidiata, Say. Como, Aug. 12, one specimen, (Moore).
Alydus eurinus, Say. Como, July 20, (Moore).
Protenor belfragei, Hagl. Como, Aug. 2, two specimens, (Moore).
Mysius longiceps, Stal. Como, July 25, two specimens, (Moore).
Ligyrocoris contractus, Say. Como, July 26, several, (Moore).
Peritrechus tristis, V. D. Victoria and Wellington, B.C., March, April and October, (Taylor).
Eremocoris obscurus, V. D. Wellington, March and April, (Taylor).
Phlegyas abbreviatus, Uhl. Como, July 26, several, (Moore).
Scolopostethus thomsoni, Reut. Como, July 2, one specimen, (Moore).
Aradus abbas, Prov. Como, July 1, one specimen, (Moore).
Plagiognathus politus, Uhl. Como, July 15, (Moore); Swamp Creek, and Island Lake, Temagami District, Aug. 14 and 12, (Palmer).
Plagiognathus annulatus, Uhl. Como, July 2, (Moore); Island Lake, two specimens, Aug. 12, (Palmer).
Hyaliodes vitripennis, Say. Como, July 20, (Moore).
Pilophorus crassipes, Stal. Como, two specimens, July 24, (Moore).
Phytocoris puella, Reut. Como. Aug. 2, (Moore).
Phytocoris pallidicornis, Reut. Como, July 14, (Moore).
Melinna modesta, Uhl. Como, July 20, Aug. 1, (Moore).
Pœcilocapsus marginatus, Reut. Como, July 8, (Moore).
Trigonotylus ruficornis, Fall. Como, July 2, (Moore).
Mesovelia bisignata, Uhl. Como, Aug. 1, (Moore).

HOMOPTERA.

Thelia univittata, Harr. Como, July 27, one specimen, (Moore).
Archasia galeata, Fitch. Como, July 7, one specimen, (Moore).
Ophiderma salamandra, Fairm. Como, Aug. 3, one specimen, (Moore).
Carynota marmorata, Say. Como, July 23, (Moore).
Pissonatus marginatus, V. D. Como, July 8, one specimen, (Moore).
Laccocera vittipennis, V. D. Como, July 25, one specimen, (Moore).
Phyllodinus nervatus, V. D. Como, July 14, one specimen, (Moore).

Clastoptera proteus, Fitch, var. *flava*, Ball. Como, July 24, (Moore).
Clastoptera proteus, Fitch, var. *vittata*, Ball. Como, July 25, (Moore).
Clastoptera proteus, Fitch, var. *nigra*, Ball. Como, July 25, (Moore).
Bythoscopus variabilis, Fitch. Como, July 14, on oak, (Moore).
Pediopsis insignis, V. D. Como, July 20, (Moore).
Oncometopia costalis, Fab. Como, July 27, two specimens, (Moore).
Dræculacephala manitobiana, Ball. Swamp Creek, Temagami district, Aug. 14, (Palmer).
Dræculacephala novaboracensis, Fitch. Como, July 2, (Moore); Red Cedar Lake, Aug. 9, (Palmer).
Xestocephalus pulicarius, V. D. Como, one specimen, Sept. 2, (Moore).
Paramesus vitellinus, Fitch. Como, July 26, several, (Moore).
Platymetopius acutus, Say. Como, July 20, Aug. 4, (Moore).
Scaphoideus auroniteus, Prov. Como, July 30, one specimen, (Moore).
Athysanus plutonius, Uhler. Como, July 2, (Moore).
Eutettix seminuda, Say. Como, July 8, one specimen, (Moore).
Thamnotettix smithii, V. D. Swamp Creek, Aug. 14, (Palmer).
Thamnotettix eburata, V. D. Red Cedar Lake, Aug. 9, Island Lake, Aug. 12, and Swamp Creek, Aug. 14, (Palmer).
Thamnotettix waldana, Ball. Swamp Creek, Aug. 14, (Palmer).
Jassus olitorius, Say. Como, Aug. 12, (Moore).
Empoasca viridescens, Walsh. Como, July 31, (Moore).
Eupteryx flavoscuta, Gill. Como, July 15, several, (Moore).
Typhlocyba tricincta, Fitch. Como, July 2, (Moore).
Typhlocyba bifasciata, G. & B. Como, July 21, (Moore).

Odonata.

Up to the present time, although a good deal of work has been done spasmodically in working up the Dragon-flies of Canada by collectors in different parts of the Dominion, as far as I am aware, no complete Canadian list has ever been prepared. That this should be taken in hand at once, is most desirable, both on account of the important role played by these insects and also from their attractive nature. Some years ago Mr. T. J. McLaughlin worked up the species of the Ottawa district, and Dr. E. M. Walker, of Toronto, has recently made extensive studies of the Odonata of the whole Province of Ontario. Up to the end of last year he had listed 65 species, and a few others have been added during the past summer. A list of 37 British Columbian species prepared by Prof. Raymond C. Osburn, of New York, is reproduced from *Entomological News* in the September Bulletin of the British Columbia Entomological Society. As already mentioned, Mr. E. B. Williamson, of Bluffton, Ind., made a short trip into Northern Ontario during the past summer for the special purpose of collecting Odonata, and Mr. McIntosh has collected in New Brunswick.

Entomologists will be pleased to learn that Dr. E. M. Walker has undertaken a complete revision of the genus *Æschna* in North America. He thinks that "the determinations of the species have been to a large extent guess work, and that not sufficient account has been taken of the females and of the colour markings." Dr. Walker writes: "I have already come to pretty definite conclusions as to the limits of the species, and find there are several more than has been believed by the best authorities to be the case. Females and colour pattern prove to be of great importance and individual variations within the species but slight. I am going to verify as far as possible my conclusions in the field next summer, but would like to

examine as much material as possible this winter. I shall be glad to receive any material in this genus, which will be taken great care of and returned named as soon as I have finished with it." This excellent opportunity for getting material worked up should not be neglected by collectors, and it is to be hoped that all will assist Dr. Walker to the full extent of their ability in this useful undertaking.

A small collection of Odonata collected in the Temagami district by Mr. W. J. Wilson, of the Geological Survey, in 1905, has been named by Prof. J. G. Needham, who reports as follows: "These are all more or less common throughout eastern Canada: but the specimens are of much interest, as they extend the known northward range for practically all of them." The list is as follows:—

Gomphus sordidus, Hagen. Kokokosing Lake, June 13, and Sturgeon River, June 29, 4 males and 8 females.

Gomphus exilis, Selys. Smooth Water Lake, June 22, 2 males.

Calopteryx maculata, Beauv. Sturgeon River, July 29, July 16.

Hagenius brevistylus, Selys. Kettle Falls, Sturgeon River, June 30.

Æschna clepsydra, Say. Kettle Falls, Sturgeon River, June 30.

Dr. Walker sends the following records:—

Somatochlora walshii, Scudd. DeGrassi Point. First Ontario record.

Somatochlora williamsonii. "I am about to describe under this name some specimens which I have had in my collection for several years, but I was not certain until recently that they were distinct from *S. elongatus*, Scudd. Mr. Williamson has taken the species in Michigan and Prof. Needham in New York. The former had recognized it as a new species and has turned his material over to me. The description will appear in the *Canadian Entomologist*. Ontario records: Toronto, DeGrassi Point, Lake Temagami." (Walker.)

Enallagma pollutum, Hag. Bala, Muskoka, Aug. 25, (W. J. Fraser).

Gomphus adelphus, Selys. Hull, P.Q., June 29, 1886, (Fletcher). The first Canadian record.

Gomphus brevis, Selys. Hull, P.Q., June 29, 1886, (Fletcher); Cumberland Ont., June 16, 1900. (Gibson).

Æschna juncea, L. Anticosti, 1902, (Dr. Joseph Schmitt); DeGrassi Pt., Lake Simcoe, Ont., Sep. 2, (Walker).

Basiaschna janata, Say. Clarke's Bush, Ottawa, May 2, 1902, (Gibson).

Macromia illinoiensis, Walsh. Hull, P.Q., June 29, (Fletcher).

Helocordulia uhleri, Selys. Buckingham, P.Q., May 31, (Fletcher).

Tetragoneuria spinosa, Selys. Hull, P.Q., May 22, 1886, (Fletcher).

Leucorhinia hudsonica, Selys. Short Bay, on Behm Canal, B.C., August 11. (J. A. Cadenhead): Anticosti, (Dr. Schmitt): Laggan, Alta., (T. E. Bean); Eastman's Springs, Ont., May 25, Hull, P.Q., June 29, (Fletcher).

Sympetrum costiferum, Hag. Victoria, B.C., (Fletcher).

Sympetrum corruptum, Hag. Banff, Alta., Sept. 13, 1897, (N. B. Sanson); Laggan, Alta., (T. E. Bean).

Tramea lacerata, Hag. Several fresh examples of this large southern dragonfly were seen near Grenadier Pond, Toronto. Sept. 15, 1906. I had no net, but succeeded in capturing a fine male. A few days afterwards they had all disappeared. (Walker.)

IN THE TRACKS OF NEMATUS ERICHSONII, HARTIG.

By Rev. Thomas W. Fyles. D.C.L., F.L.S.

It is a law of nature that no particular growth of plants should hold possession of the land in perpetuity. Sooner or later destructive agents will break in upon the scene. Insect depredators, drought, fire, storm and flood —*these*, and the axes of the lumbermen, make clearances for occupation by the settler, or for Nature's re-planting. In the latter case we find that the new growth is, generally speaking, different from the old. The following affords a curious exemplification of this fact:—

In 1842, when the Ashburton Treaty was made, a strip, 60 feet wide, was cut along the border, through the tamarack swamps that extend from Canada into New Hampshire and Maine. This strip is now filled up with a new growth; but the forester knows directly when he strikes the line, for he finds a belt in which the poplar (*Populus tremuloides*), the red cherry (*Prunus Pennsylvanica*), and the Moosemissie (*Pyrus Americana*), are growing, the seeds of the first having been carried by the wind into the Boundary, when newly cleared; and those of the last two, by birds.

Thirty years ago it was a fine sight to look, from an elevation, upon the vast area of swamp land, extending through Bury, Lingwick, Hampden, Ditton, and far away. Tamaracks from two feet to two and a half feet in diameter, were the lords of this forest-land. To-day, I have the authority of Mr. Ayton Cromwell and Mr. C. C. Lusk, of Cookshire, and Mr. C. H. Ward, of Bury—all experienced foresters—for stating that not a single first-growth tamarack is to be found in the whole section. And like testimony comes to me from Mr. John D. Johnson, of St. Thomas, and Mr. E. W. Brewster, of Compton, in regard to the districts with which they are respectively acquainted.

How was the destruction brought about? By an agent seemingly insignificant and wholly unexpected—a four-winged fly, belonging to the order *Hymenoptera*, and named by Hartig, *Nematus Erichsonii*.

This fly is only about eight-tenths of an inch in expanse of wings, and four-tenths in length of body. Its colour is black, but it has a broad orange-red band round the abdomen. Its wings are clear, with dark veins, and a conspicuous costal spot or *stigma*.

In the larval stage—which is the destructive stage—the species is a green caterpillar of no great size, having a black head. When it is "full-fed," it creeps into some retreat, and spins a compact, brown cocoon, about half an inch in length.

It was in the pupal stage, probably, and amongst the roots of young plants of Norway Spruce, that the species was brought to the nurseries of Massachusetts, about the year 1880.

The first notice of the arrival of the *Nematus* in Canada was given by myself, and will be found on the 17th page of the Report of the Entomological Society of Ontario for 1883. When the creatures came to us, they came in their strength—"In numbers numberless." The Nematus Raid, as it was called, was a phenomenon that they who witnessed are not likely to forget. That creatures seemingly so insignificant, brought unwittingly from a country so far away, should, by force of numbers, be able to strip the vast forest of tamarack of its verdure, and leave the trees in a dying state was truly marvellous.

I last saw the creatures in activity about ten years ago, in a grove of young tamarack near the old St. Henry Road, in Levis County. The trees were about twenty feet high; and here and there amongst them was a small

colony of Nematus larvae. The grove mentioned has lately been felled, and the land it occupied turned into a pasture.

The Nematus larvae had a preference for the finest growths. The smaller trees of the time were not at first so badly treated by them; and these lingered on, making brave efforts at recovery; but even these have for the most part, now succumbed. Probably the drought of 1903 gave the finishing blow to them.

Mr. E. B. Brewster tells me that half a mile from Compton Village, there is a tamarack swamp about a mile long and one-eighth of a mile wide. The largest trees in it are ten or twelve inches in diameter. Of all the trees in the swamp, probably 75 per cent. are dead, and about 15 per cent. show some signs of feeble life in tufts of sprouts from the stem. The only apparently healthy trees are on the borders of the swamp, and form a mere narrow fringe to it, one or two trees deep.

Of the dead trees in this swamp, some are only "rampikes," denuded both of branches and bark. To others the branches still cling. Here and there, among the dead trees, a few balsams (*Abies balsamea*) and cedars (*Thuja occidentalis*) are springing up.

When I visited the swamps in Bury in 1891, the rot had struck into the dead trees for two or three inches. For an account of this visit, and a calculation of the damage done by the Nematus, see the Report of the Entomological Society of Ontario for 1891, page 28.

When the Rutland Railway into Canada was in contemplation, dead tamarack trees lay so thickly in the swamp half way between Alburgh and Noyan, that they had to be hauled out of the way, before the survey for the line could be effected. This was in the fall and winter of 1898-9. The authority for this statement is Mr. Alanson Vosburgh, per Miss May G. Johnson of Miranda, P.Q.

In the part of Bury where I saw Maddock's gang getting out the knees for vessels in 1891, the land has been brought under cultivation.

A few notes to tell further of the kinds of trees that are springing up in place of the tamarack may be desirable.

In the Ditton Swamp, which is about three miles long and a mile broad, the tamaracks young and old are all dead. Spruce is taking their place.

In the Spalding Hill Swamp, in Eaton Township, cedar, poplar and some young tamarack are growing.

In the Harrison neighborhood in Bury Township, in parts where the soil is sandy, white birch and a few balsams are growing; on wet clay, the poplar appears.

In Long Swamp, which extends through Newport, Hampden, and over to Lingwick, spruce and balsam are growing.

To those who would see a tamarack swamp in its infancy, I would recommend a visit to "The Gomin," which lies to the west of Bergerville, about four or five miles from Quebec. In the early Summer it is all aglow with rhodora, sheep-laurel, orchids and pitcher-plants. When I first saw it in 1886, it was a broad expanse of sphagnum, unoccupied, save on its outskirts, by any larger plants than those I have mentioned. I re-visited the swamp on the 10th of July last, and found that it was dotted all over with young tamarack from a foot to fifteen feet high. On the borders of the swamp near the cultivated land there were tamaracks twenty-five feet high or more.

Doubtless, if left undisturbed, the growth on this tract will, in process of time, become a forest. And so—

"The old order changeth and giveth place to new."

THE NOTODONTIDAE OF THE PROVINCE OF QUEBEC.

By Rev. Thomas W. Fyles, D.C.L., F.L.S.

This interesting group of insects is not as well known as some other families of the Lepidoptera. *Datana ministra* Drury, *Nerice bidentata* Walker, *Symmerista albifrons* Smith and Abbot, and *Schizura concinna* S. and A. are not uncommon with us; but other species are extremely rare; such are *Odontosia elegans* Strecker, *Dasylophia thyatiroidea* Walker, *Heterocampa pulverea* Grote and Robinson, and *Cerura multiscripta* Riley. Of each of these kinds I have taken but one specimen in many years.

Imagos of the different species are sometimes attracted by light, and sometimes they are found at rest on palings and the bolls of trees. They are generally regarded as prizes by Entomologists.

The larvae of most of the Notodontidae are remarkable objects. Some of them assume grotesque attitudes; for instance *Datana ministra* Drury, which raises the fore and hindmost parts of its body in a threatening manner and takes the form of a bow. Some, in their early stages, are strangely horned, as is the case with *Heterocampa guttivitta* Walker in the first stage, and with *Heterocampa biundata* Walker in the first and third stages. Probably in these stages they are most in danger from ichneumons. Others again are furnished with tooth-like prominences on the back, as *Hyperaeschra stragula* Grote.

Fig. 26—Larva of *Pheosia dimidiata*. (Herrich Schaeffer.)

Fig. 27—Larva of *Schizura unicornis*. (Smith and Abbott.)

The handsome larva of *Pheosia dimidiata* Herrich-Schaeffer Fig. 26) has a very rakish appearance. Its long body straight and trim, with its beak-shaped anal horn, is suggestive to me of an ancient galley, or an Algerine pirate boat—the conspicuous spiracles look like the openings for a bank of oars.

The green larva of *Nerice bidentata* Walker affords a fine instance of mimetic analogy. It feeds on the edges of a leaf; and its jagged dorsal-outline presents a resemblance to the leaf's serrations.

The larvae of *Symmerista albifrons* Smith and Abbot, and those of *Schizura concinna* S. and A., (Fig. 27) have gouty swellings highly colored To gardeners the larvae of *concinna* are known as "Red-humped Caterpillars." They are sometimes very injurious to young apple trees. Where apple trees are scarce, as in the neighborhood of Quebec city, they feed on the blackberry, etc. The *albifrons* larvae are often abundant upon basswood They have the habit of hoisting the hinder parts of their bodies, and opening their claspers wide until they resemble nippers.

The larvae of *D. ministra* feed on the birch, hazel, butternut, etc. Those of *Melalopha inclusa* Hubner spin webs upon the poplars.

The four last named species are gregarious.

The caterpillars belonging to the genera Cerura and Harpyia (the moths of which are familiarly known as "Kittens") are furnished with extraor-

dinary forked and whip-like tails, which can be raised and thrown forward and agitated, as occasion requires. They are believed to be protective—their motion intimidating the ichneumons that would assail the larvae. The species have been called, on account of these tails, *Dicranuridae* (*Dikranos*, two-pointed; *oura*, a tail).

A Dicranura larva, when "full fed," forms a compact cocoon, into which it works particles of the substance to which it attaches itself. Some seasons ago, at the bottom of my insect breeding-cage, there was lying a dead pupa of a hawk-moth. A larva of the kind mentioned chose to fasten itself upon this, and to work frayings from the case into its cocoon; this, in its finished state, was apparently a mere excresence of the hawk-moth pupa.

The imagos of the Notodontidae are, generally speaking, of good size and fine appearance. The smallest of our Quebec species (as far as I know them) are: *Melanopha inclusa* Hubner, and *Gluphisia septentrionalis* Walker. The former is the "*Clostera Americana*" of Harris, and is fully described in the "Insects Injurious to Vegetation" of that author, pages 431-4. The forewings of the moth are grey, clouded with rust-red and brown. It may readily be known by the whitish V-like mark extending across the fore-wing. It expands an inch and a quarter. The latter species is a prettily marked one. The base of the fore-wing is brownish grey; then comes a band of pale grey, and then a central band of warm brown, bordered on either side with a dark brown line. In this band not far from the costa is a pale spot. Beyond the central band the wing is pale grey, clouded with darker grey, and having a wavy line of black dots near the hind margin. The insect expands an inch and two lines.

Fig. 28—Datana ministra.

Datana ministra Drury is a fine moth. (Fig. 28.) It varies in color from reddish ochre to brown. The hind margin, in the fore-wings, is crenated. Not far from the base of the wing is a curved cross-line; and, beyond this, are three parallel cross-lines. Running from the outer angle, for a short distance, into the wing, is a curved line. *Ministra* measures two inches in expanse of wings.

Hyperaeschra stragula Grote is a handsome moth. Its fore-wings are richly colored with dark grey, brown and red. Near the hind margin is a beautiful feathery line. The hind wings are white with a touch of brown at the inner angle. The insect is an inch and five lines in expanse of wings.

To my mind the Queen of Beauty among the Notodontians is the Elegant Prominent, *Odontosia elegans* Strecker. (Fig. 29.) It measures an inch and ten lines in expanse of wings. Its fore-wings are of a soft rich dove color. From the tooth on the inner margin of the wing to the base is a patch of brick-red; and at the hind margin are two parallel, scalloped, dark lines. The hind wings are white with a purplish patch on the inner angle.

The bill-hook like curve that is seen in the inner margins of the fore-wings of several of the Notodontians is conspicuous in *O. elegans*. Other species that have the curve are:— *Hyperaeschra stragula* Grote, *Notodonta*

basitriens Walker, *Lophodonta ferruginea* Packard, *Pheosia dimidiata* Herrich-Schaeffer, *Heterocampa biundata* Walker, *Ianassa lignicolor* Walker.

Notodonta basitriens Walker is another fine insect. It is an inch and ten lines in expanse of wings. Its fore-wings are brownish-grey, with a reddish brown base outlined with brown of a darker shade. It has two transverse lines, scalloped inwardly, at about two-thirds of the length of the wing. The bases of the wings of *basitriens* are suggestive of a small moth, with outspread wings, superincumbent upon the larger one, but in reverse position.

Heterocampa pulverea Grote and Robinson, a pretty grey moth, has somewhat of the same appearance (on a more extended scale); and so has *Macrurocampa marthesia* Cramer. The prevailing colour of the last named insect is creamy white. The base of the wing is of a warm brown outlined with darker brown. Near the centre of the wing is a distinct brown oval spot. The insect is an inch and eight lines in extent of wings. *H. pulverea* is an inch and a half.

A remarkably handsome moth is *Lophodonta ferruginea* Packard. It is two inches in expanse of wings. Its prevailing tint is a rich coffee-colour. It has white and brown scalloped lines crossing the fore-wings, and a large white patch on the costa of each of these wings.

Pheosia dimidiata Herrich-Schaeffer (Fig. 30) is one of the largest of our Notodontians—it is two inches and two lines in expanse of wings. It is our Canadian "Swallow Prominent." The prevailing colour of its wings is white; but in some specimens this is tinged with brown. It has an elongated dark brown patch on the lower part of the costa, broken into by a white curved line. Along the inner margin, the fore-wing is dark brown;

FIG. 29.—*Odontosia elegans*. (Strecker.)

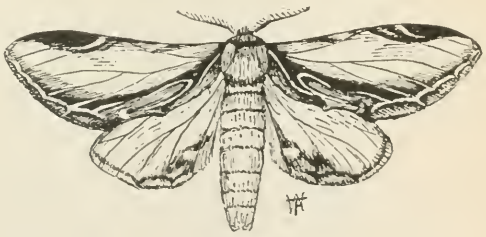

FIG. 30.—*Pheosia dimidiata*. (Herrich Schaeffer.)

and this colouring gradually fades and narrows along the hind margin till it ends at the outer angle. It is interrupted by white linear markings, one of which takes the form of a long oval. At the inner angle of the hind wing is a brown patch.

A fine moth of neat colouring is *Nadata gibbosa* Smith and Abbot. It is an inch and ten lines in expanse of wings. Its prevailing tint is ochreous, and it has a band of darker colour across the fore-wing, narrowing towards the inner margin. Within this band, not far from the costa, are twin white spots, small but distinct. *Gibbosa* bears a remarkable projecting crest on its thorax.

Nerice bidentata Walker and *Symmerista albifrons* Smith and Abbot are well known moths. In the former, the brown and grey of the fore-wings in striking contrast—the brown having two tooth-like projections—in the latter the conspicuous white border to the lower half of the costa are features that are easily recognizable.

Dasylophia thyatiroides Walker expands an inch and eight lines. It is of a light warm brown. The hind margin, in the fore-wings, is sharply indented. On the hind margin there is an oval spot; and on the inner margin a white lunette bordered with black. Curved lines extend from this across the wing.

Heterocampa biundata Walker is a handsome ample-winged moth. It is grey with an olive tint, and is marked with wavy lines. The hindmost of these presents a dotted appearance. The moth expands about two inches.

Heterocampa manteo Doubleday and *Heterocampa guttivitta* Walker are moths difficult to describe for general readers. Their tints are blended grey and brown and they have numerous dotted lines across the wings. The expanse of wings of *manteo* is an inch and seven lines; that of *guttivitta* is an inch and a half. *Manteo* has dark brown serrations on the hind margins of both primaries and secondaries. *Guttivitta* has a band across the primaries, feather like, with a large brown dot in each curve of the band.

Ianassa lignicolor Walker is an insect of trim and neat appearance. Its fore-wings are whitish grey darkened towards the hind margin. The fore-wings have a somewhat striated appearance. Across the middle of each of them is a confused brownish band, and beyond it is a second less distinct. The hind margins of these wings are crenated. The moth expands an inch and three-quarters.

Schizura concinna Smith and Abbot is the moth that comes from the "Red-Humped Caterpillar." It is of a rather insignificant appearance. Its fore-wings are reddish-brown, its hind wings grey, with a white border. It is an inch and five lines in expanse of wings. *Scizura semirufescens* Walker is somewhat larger than *concinna*, but in no way more attractive.

Scizura unicornis Smith and Abbot is easily recognized from its habit of wrapping its wings around its body, and raising itself at an angle from its support, so that it looks like a leafless twig. Its fore-wings are richly variegated with grey, brown, red and yellow, and have numerous cross-markings. The species measures an inch and four lines in expanse of wings.

The moths called the "Kittens" come next in order.

In Packard's "Forest Insects," page 566, Riley's cut of *Cerura multiscripta* Riley is given. The insect has white fore-wings prettily marked with transverse black lines. I have one specimen taken at Cowansville long ago.

Harpyia borealis Boisduval is a pretty moth with pale grey fore-wings, crossed with a band of dark grey outlined with black. It has, near the hind margin, a dark grey patch extending from the costa half way across the wing. Both fore and hind wings are conspicuously dotted along the hind margins with black.

Harpyia cinerea Walker is a plainer insect than *borealis*. It has dark grey fore-wings and white hind wings; both bordered with black dots on the hind margins. as in the case of *borealis*.

In *Harpyia scolopendrina* Boisduval the cross band takes the outline of an hour-glass.

Usually the "kittens" are about an inch and four lines in expanse of wings. The larvae of all the species are found upon willows.

I have no doubt there are other kinds of Notodontidae to be found in Quebec Province, but I have not been so fortunate as to meet them. The study of this interesting family of insects will repay the Entomologist for his time and attention in the gratification it will afford him.

THE LOCUST MITE.

By T. D. Jarvis, Ontario Agricultural College, Guelph.

During the past summer the Locust Mite (*Trombidium locustarum*, Riley) has been very common at Guelph, especially on the Red-legged Locust (*Melanoplus femur-rubrum*), but a few specimens have also been found upon the Two-striped Locust (*Melanoplus bivittatus*). The mite is most generally found attached to the base of the second pair of wings, although it is also found on the wing itself, and on any other part of the body where it cannot be readily detached by the locust; a favourite position upon the body is between the segments of the thorax and abdomen, and also behind the upper joints of the legs; in such positions their only means of attachment to their host is apparently by their mandibles.

The young mites are nearly spherical, and look very much like the eggs of insects (Fig. 32, *b*). The mite sucks the blood of its host until it reaches maturity, during which time it often becomes so swollen with food that its legs are rendered very inconspicuous (Fig. 31, *a*). As many as five of these young larvae have been found upon a single locust.

The adult mite is of a bright crimson color and about one-eighth of an inch long (Fig. 31, *c*, *d*). When full-grown it passes to the ground, where it remains over winter. Dr. Riley, who has studied the life-history of this mite, states that the eggs are laid an inch or so under the ground in clusters containing between 200 and 400. Early in the spring from these eggs emerge the young mites, which, upon reaching the surface of the ground, attach themselves to their hosts. These little mites render good service in checking the spread of the locusts, as almost every locust upon which one is found appears to be more feeble and sickly than those which have not been attacked.

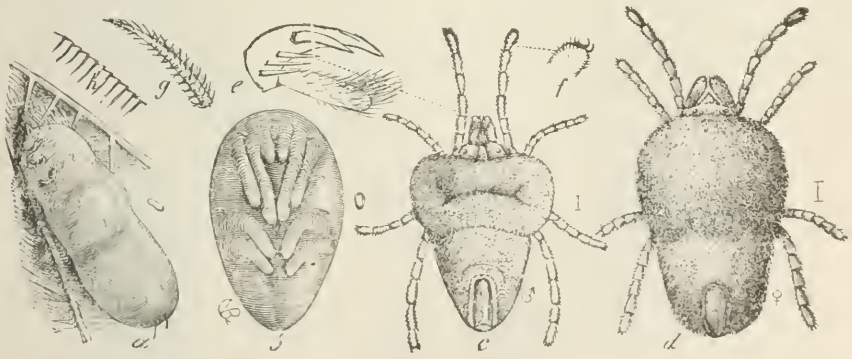

Fig. 31—Trombidium Locustarum—(*a*) mature larva when about to leave the wing of a locust; (*b*) pupa; (*c*) male adult fresh from the pupa; (*d*) female—the natural sizes are indicated by the short lines on the right (*e*) palpal claw and thumb (*f*) pedal claws; (*g*) barbed hair; (*h*) the striations on larval skin (after Riley.)

THE OYSTER-SHELL BARK LOUSE.

By T. D. Jarvis, Ontario Agricultural College, Guelph.

The purpose of this article is to place before the fruit-growers and all interested in practical entomology, the main facts regarding the life-history, habits and appearance of the Oyster-shell Bark Louse Scale, and of the scales which are often mistaken for it. The damage done by this scale of late

years has attracted so much attention, and so many enquiries have been received concerning the best methods for its eradication, that it is hoped earnest efforts will be made at once by all concerned to get it under control.

The Oyster-shell Bark-louse (*Mytilaspis pomorum or Lepidosaphes ulmi* Linn, as it is now called) is widely scattered throughout the orchards of Ontario, and the damage done by it is very considerable over the Province and rapidly on the increase.

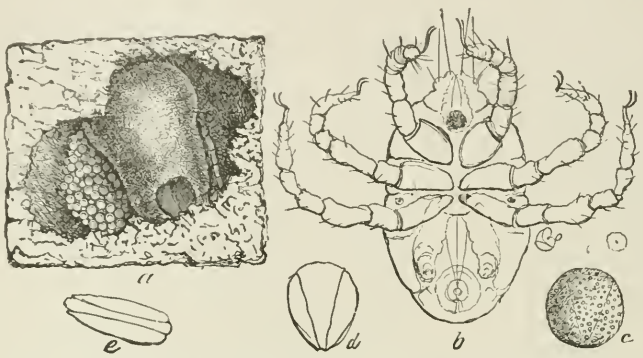

FIG. 32—TROMBIDIUM LOCUSTARUM—(*a*) female with her hatch of eggs: (*b*) newly-hatched larva—natural size shown by the dot in a circle on the right; (*c*) egg; (*d*, *e*) empty eggs-shells (after Riley.)

Although of European origin, it has been known in America for more than a century, and has gradually spread throughout the larger portion of North America.

This scale is a very serious pest in orchards which are neglected and badly treated, but experience has shown that with careful treatment it can be readily kept in check. It has been found to occur on the following trees and shrubs: Apple, plum, pear, wild red cherry, grape, currant, rose, maple, poplar, ash, birch, and various others.

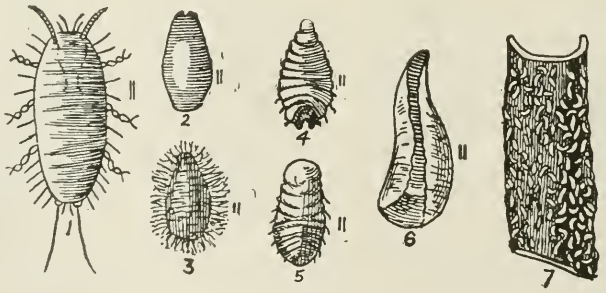

FIG. 33—The Oyster-shell Bark-louse.

In order to combat this scale, it is first absolutely necessary that one should be well acquainted with its life-history.

Life-history.—This minute insect, found upon the bark of the small twigs and also upon the branches and trunks of the above-mentioned trees, is readily identified by its oyster-shell-shaped scale, about one-sixth of an inch in length. It is of a brown colour, and, thus disguised by the bark, is not seen unless by close observation. Usually a good many are clustered together, and their shape is so marked that orchardmen should soon recog-

nize them. These scales sometimes cover twigs and large branches completely; even the leaves are often infested, and sometimes the fruit itself becomes more or less covered. Last year the fruit on several Maiden's Blush apple trees grown in the orchard of the O. A. C. was noticed to be affected by the scale. This, however, is the exception rather than the rule.

The insect is one-brooded, and winters over in the egg stage. The eggs can be easily seen if at any time in the fall or winter the old scales be lifted up and examined beneath. Numbers of very small whitish-yellow eggs will be seen. Here beneath this oyster-shaped scale they remain until early in the summer. The young yellow lice escape from the eggs during the last week in May and the first week in June; that is, in the vicinity of Guelph. They

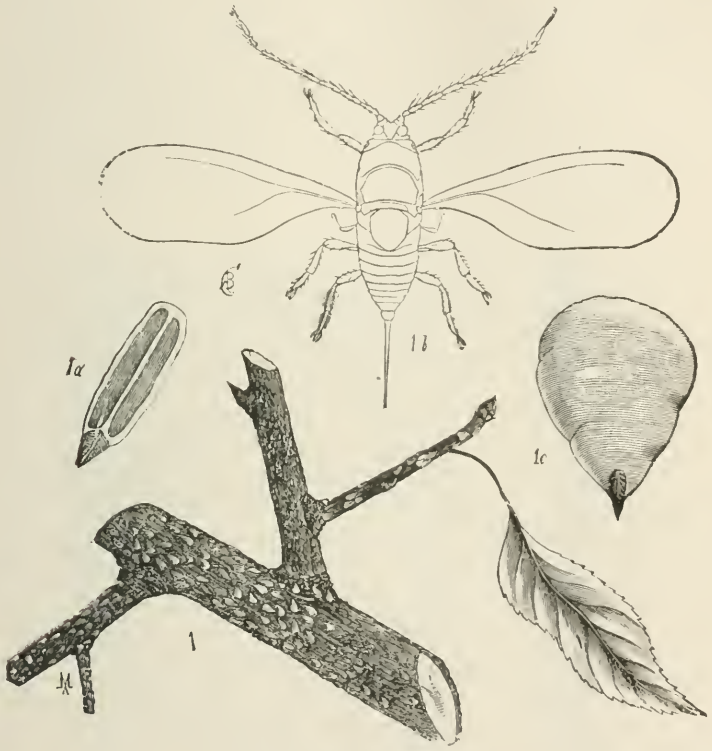

FIG. 34—The Scurfy Bark-louse.

wander for a few hours, or a few days, on the limb, then settle down and secrete a scale. They fix themselves upon the tender bark, which they pierce with the beak-like structures connected with their mouths, and by means of which they are able to suck the sap from the tree. The larvae moult, or shed their skins, twice in the course of their growth during the summer. These moults can be readily seen on the narrow end of the large scale. The adult female dies soon after the laying of the eggs, about 60 in number, in the fall. They may be spread from tree to tree to some extent by birds, and also by other insects.

Such is the life-history of the Oyster-shell Bark-louse, and before entering into a discussion as to the best means to adopt for its eradication, it will be as well to briefly mention and describe one or two other species of the commonly-occurring scales which most closely resemble it, and to point out the differences for this purpose cuts are given with the various scales.

The Scurfy Bark Louse (Chionaspis furfurus).—The Scurfy Bark-louse is not so widely distributed through Ontario as the Oyster-shell Bark-louse, and does less damage. It occurs most commonly on pear, apple, gooseberry, and black currant. This scale resembles the Oyster-shell Bark-louse closely in shape and size, the main points in which they differ being in the colour of the eggs and in the adult scale.

The eggs of the Scurfy Bark-louse are of a purplish colour, whilst those of the Oyster-shell are a whitish-yellow. The adult scale of the Scurfy Scale is also white in colour. The female scale is much larger and more oval than the male scale.

The same remedies may be employed against the Scurfy Bark-louse as are advised in this article as being most suitable for the Oyster-shell Bark-louse.

San Jose Scale (Aspidiotus perniciosus).—The San Jose Scale is readily distinguished by the characteristic shape of the female scales. They are round and nearly white, with generally a clearly-defined central nipple. After the first moult the scales become almost black, with a conspicuous depressed ring around the nipple. The adult male scale is oblong in outline, with the nipple near one end, and is much smaller than the female.

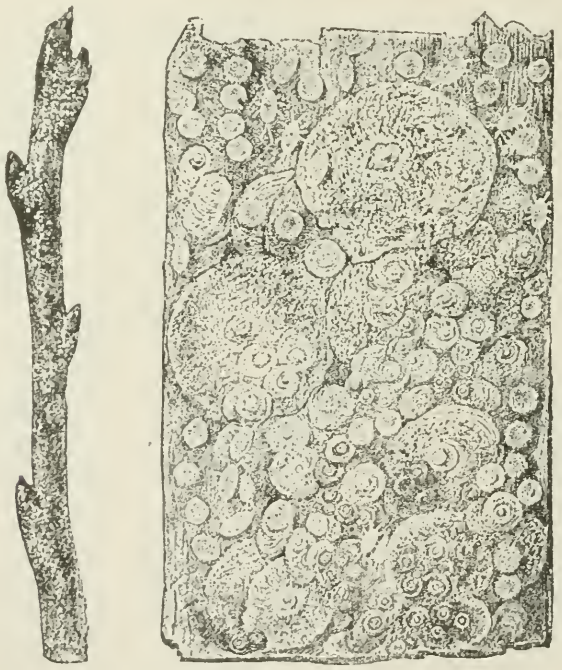

FIG. 35—San Jose Scale.

The following points will clearly separate the San Jose Scale from the Oyster-shell Bark-louse and the Scurfy Scale:

First: The arrangement or grouping of San Jose Scales on the bark is generally characteristic, and is often sufficient to at once identify them.

They seldom have a tendency to cluster, if there be few in number, but, instead, are scattered somewhat evenly on the bark.

On badly-infested trees the presence of the scale on new growths and the fruit produces a deep-red coloration on the tissues of the bark.

It leaves no conspicuous, ventral, whitish scale on the bark after the removal of the insect, as does the Scurfy Bark-louse.

The reason for considerably more damage being done by the San Jose Scale than by the Oyster-shell Bark-louse is on account of the San Jose Scale producing many broods in one season, and also bringing forth its young alive, whereas the Oyster-shell Bark-louse is one-brooded and winters over in the egg stage.

The treatment to be adopted for nearly all the scales is practically the same in all cases. On deciduous trees, where the scales remain during the winter upon trunks and branches, and where the trees become dormant, the scales are best treated during the winter. At that time there is no foliage to interfere, and much stronger washes can be used than would be possible during the summer, or when the tree is active. It is extremely difficult to penetrate insect tissues with ordinary liquids, and it has been found impossible in practice to obtain good results in the destruction of scale insects, except by means of caustics. The common soaps are all caustic, and, when applied in strong solutions, the scale is shrivelled, lifted, and partially corroded, so that the oily mixture works its way beneath into absolute contact with the insect. Or it is raised at the edges and washed off by the rains, carrying with it either eggs or young, as the case may be. In fact, where the eggs hibernate, winter applications act only by exposing them, so that they are easily washed away by rains and scattered.

In the case of plants which do not lose their foliage at any period, or in conservatories, or where winter treatment for any reason is not feasible, we must attack the insects when the larvae are crawling about, and before they are fixed. At that time, whilst not protected by a scale, they may be easily killed, almost any of the contact insecticides being effective.

Remedies.—Owing to the large number of applicants who were desirous of obtaining information on the best methods of combating the Oyster-shell Bark-louse, it was decided to carry on a number of experiments here, to test the efficiency of the various insecticides commonly used against scale insects.

Of all the spray mixtures tried, the well-known lime, salt and sulphur wash gave the best results.

The lime, sulphur and caustic soda, and the lime, sulphur and sal soda were also tried, but without quite such good results. The lime, sulphur and caustic soda proved to be a little superior to the lime, sulphur and sal soda, owing to its apparent power of better penetration.

Soaps.—Various soaps were also tried, and of these the Whale-oil Soap Emulsion gave the best results, many of the scales being killed.

The Whale-oil Soap gave good results also, but not equal to the Emulsion.

Sunlight and Lifebuoy soaps, and also a mixture of both, proved to be of very little value, inasmuch as they did not prevent the eggs from hatching. These soaps are claimed by the makers to be most effective against the San Jose and other scale insects, but applied as a winter wash against the Bark-louse they have little value. Undoubtedly they should be applied after the young lice hatch, and not as a winter application, and then would most likely prove effective against the tender lice.

Kerosese Emulsion.—Kerosene Emulsion was also tried, and this proved of more value than the Whale-oil Soap Emulsion, but not so effective as the lime, salt and sulphur wash.

Lime. Quick slaked lime, 1½ lbs. to 1 gallon of water, proved very effective applied as a winter wash, and equalled the results obtained by the lime, salt and sulphur.

Kerosene-Lime.—This was also tried, but did not prove superior to the Kerosene Emulsion, and therefore is not to be preferred to it.

The lime-sulphur sprays must not be applied while the trees are in foliage, first, because of the disastrous results that follow when this is done before the leaves have matured; and secondly, becaue of the difficulty in making a thorough treatment at such a time. The month of March and the early part of April, before the buds commence to open, is a good time to spray with these mixtures.

THE BEAN WEEVIL (*Bruchus obtectus*, Say).

By Arthur Gibson, Assistant Entomologist, Central Experimental Farm, Ottawa.

An insect which, fortunately, has only been reported on a few occasions as doing damage in Canada, is the Bean Weevil, *Bruchus obtectus*, Say. Authentic instances of injury by this insect have been received from one locality in Ontario, and from two in Quebec. The injury in all cases was to seed beans.

The Bean Weevil (Fig. 36) is a small, hard-shelled beetle, one-tenth of an inch long, oval in form, with the head bent down and more or less concealed, as seen from above, and prolonged into a squarely-cut snout, or beak. Its antennae are distinctly jointed and enlarged at the tip, the first four joints and the last one reddish. The wing-covers are marked with ten impressed and dotted longitudinal lines, and the whole body is covered with long, silky hairs. The lines on the wing covers are broken up into pale yel-

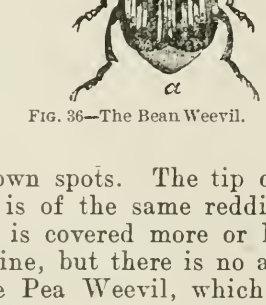

Fig. 36—The Bean Weevil.

lowish dashes and dark brown spots. The tip of the abdomen extends beyond the wing-covers, and is of the same reddish tinge as the tips of the antennae and the legs, but is covered more or less with short, silky hairs, and bears a central white line, but there is no appearance of the two black spots so conspicuous in the Pea Weevil, which it resembles in shape and movements. Compared more closely with this latter well-known inect, the Bean Weevil is not one-half so large, is more soberly colored, having less white on the wing-covers, and lacks the white spot on the middle of the

hinder part of the thorax, and the two black spots mentioned above, which are present on the exposed tip of the abdomen of the Pea Weevil.

"The life-history of the Bean Weevil differs in some important points from that of the Pea Weevil. The eggs of both are laid upon the pods while these are young and tender. On hatching, the young grub of the Bean Weevil eats its way inside and penetrates one of the forming beans, several grubs entering a single bean, each one forming for itself a distinct cell. They become full-grown, and change to pupae in the autumn, and a little later to the perfect beetles. The date of emergence from the seed depends very much, as in the case of the Pea Weevil, on the temperature in the autumn months; it may be in the late autumn or not until next spring; when the seed beans are stored in a warm building, the beetles may emerge at any time through the winter. One of the important differences between the life-histories of the Pea and Bean Weevils is that, whereas in the case of the former the young grubs can only enter the soft green seeds, those of the Bean Weevil can propagate for three or four generations in the dry stored seeds. This fact renders the well-known domestic remedy for the Pea Weevil, of holding the seed over for two years, quite ineffective in the case of the Bean Weevil; that is, if the bag of peas infested with the Pea Weevil were put away for two years, the Pea Weevils would emerge the first spring and die in the bags. But in the case of a bag of beans infested by the Bean Weevil kept in the same way, the beetles on emerging would at once set to work to lay eggs on the beans. The young grubs when hatched would penetrate the dry seeds and go through all their stages, and this breeding might be repeated as long as the supply of beans lasted. Curiously enough, the Pea Weevil does not bore holes through the paper or cotton bags in which infested seed has been stored, but in the case of the Bean Weevil, such bags are readily perforated and the beetles escape,—frequently when this happens in houses, as is sometimes the case, to the great consternation of the inhabitants." (Fletcher, Bull. 52, Cent. Exp. Farm, Ottawa.)

In the United States the Bean Weevil has been known for a great many years. It was found injuring beans in America in 1860, near Providence, Rhode Island. Since then it has become wide-spread in distribution in that country, and has done a considerable amount of damage. At first it was considered to be a native species, but it is now thought that the original home of the insect was in Asia, and that it was introduced into America through commerce. The first record of injury done by the Bean Weevil in Canada was in 1898, in Middlesex County, Ontario, and since then two further instances of loss from the ravages of this insect have been reported from Quebec Province. Quite recently the writer heard of the presence of the Bean Weevil at Guelph, Ont., in beans imported for seed from the United States. (It has also been reported from Aurora, Ont.—C.J.S.B.)

The Bean Weevil shown herewith is only about half the size of the Pea Weevil, but resembles it in general appearance. The best remedy for both of these insects is bisulphide of carbon. The most convenient way to fumigate is to place the seed in an ordinary coal-oil barrel, and pour on it one ounce of the bisulphide of carbon for every 100 lbs. of grain, then close the barrel tightly, first with a wet canvas or cloth, and on the top of this boards, which should be left undisturbed for at least two days.

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ANNUAL REPORT

OF THE

Bee-Keepers' Association

OF THE

Province of Ontario

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

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1907.

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TORONTO

la BK.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Ontario Bee-Keepers' Association for 1906.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

Toronto, 1907.

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Ontario Beekeepers' Association.

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Ontario Beekeepers' Association.

ANNUAL MEETING.

The twenty-seventh Annual Convention of the Ontario Bee-Keepers' Association, was held in the County Council Chamber, Toronto, on the 7th, 8th, and 9th of November, 1906.

The President, Mr. H. G. Sibbald, Claude, Ont., occupied the chair at all the meetings in a very acceptable manner. The meetings were largely attended and the greatest of interest was manifested throughout.

The Hon. Nelson Monteith, Minister of Agriculture, attended one of the sessions, and took part in the discussion.

The president took the chair, and called the meeting to order, after which the minutes of the last meeting were read and adopted.

Mr. R. H. Smith: I would like to ask whether the Department took up that matter of the adulteration of honey in Ontario, or if steps were taken to vindicate the character of the bee-keepers in Ontario?

The Secretary: I have the following letter from Ottawa:

Ottawa, Nov. 5, 1906.

Dear Sir,—In reply to your letter of the 2nd instant to the Minister, any correspondence received by this Department in regard to adulterated honey has been transferred to the Department of Inland Revenue, to which I am transferring your letter just received.

Yours truly,

Geo. L. O'Halloran,
Deputy Minister of Agriculture.

PRESIDENT'S ADDRESS.

By H. G. Sibbald, Claude.

It is my pleasure to again greet you, to bid you another welcome to the annual meeting of the Ontario Bee-keepers' Association, which is, I believe, the twenty-seventh meeting of this association.

I regret that I cannot congratulate you on having had an abundant yield at this our harvest home meeting. Still some words of cheer ought to be said, and I can truthfully and confidently assure you that we are one year nearer a great big crop than we were at this time last year. The price of honey has advanced to nearly where it always ought to stay. Honey is a cheap and most wholesome food at 12½ to 15 cents per pound, and at those prices will compare most favorably with other foods, and as a healthy pure food for mankind it cannot be excelled.

There is no reason why prices as at present should not be maintained. This is Canada's growing time. Thousands are pouring into our country. Cities, towns, and villages are growing at a tremendous rate, and it is up to us to supply the people with the best food—honey.

Bee-keeping in the past has been marked by progress. No industry has made more rapid strides, and still we are going ahead. Appliances, devices, methods are being adapted and used to enable the bee-keeper to keep more bees, produce more honey, and live comfortably and with the dignity becoming our most interesting occupation

Our Association should have much credit for this advancement, having secured laws that have saved the industry from destruction. Along this line will come before you an announcement intimating that our grant for the suppression of Foul Brood is to be doubled, showing also that a deep interest is being taken in our industry and this association by the Hon. Nelson Monteith.

There are some other things I would like to say. The Foul Brood Act, as some of you are aware, has been changed, taking away from the Association the right to appoint and the right to direct the inspector. That is now in the hands of the Department of Agriculture. This was not done in an arbitrary way at all. The committee consisting of Mr. Couse, Mr. Gemmell, Mr. Miller, Mr. Hall, and myself were invited to interview the Minister, and we all said it would be better if such a step were taken. The inconsistency of the old plan was shown up very plainly, that is, the President had the directing of the Inspector and the Department had the paying. The Department thought it either ought to be both done by the Association or both done by the Department, and we thought that as the President changes from year to year it would be better if the Department were to take it over. The amendments, as recommended by our Association last year, were taken into consideration, and the new Act was based, I think, on this recommendation. They are not just as we sent them in; perhaps they are better. We will find that out in the working of the new Act.

In regard to the Horticultural Exhibition, I may say they are doing a lot of hard work on that exhibition, and our Association is co-operating with them. It was my duty to come to Toronto together with other directors and the President, and the Mayor of the city, and we met the Eastern Passenger Association. The outcome of that meeting was that we obtained single fare rate for a full week, and two days in which you can come from any part of the Province to Toronto at half fare. It was by means of this Association co-operating with other Associations that we were able to get that advantage.

Mr. J. D. Evans, Islington: As a member of the Municipal Council, and having been associated with them for twenty-seven years, I am charged by the Warden to welcome this Association to our building. We are glad to have you this year, and we hope that for many years in the future the bee-keepers will meet in our old historical hall.

The Chairman: I am sure we are all grateful to the County of York for placing this hall at our disposal.

R. H. Smith, St. Thomas: Our President has said that this was the twenty-seventh annual meeting of the Ontario Bée-keepers' Association. I was one of the members present at the first meeting held in the city hall. We have made advance in many ways, but not as many advances as I would like to see. Bee-keeping, as I found it when I joined the Association, has not advanced as far as it should, particularly among the farmers. We find first-class honey put on the market in a very crude state by the farmers, and it is a very short sighted policy on their part. If they would only take more interest in bee-keeping, and join the local Association, they could be very much enlightened, not only for their own benefit but for the benefit of bee-keeping generally. Your directors have been trying to follow the suggestions that Mr. Pettit gave in his paper last year, of how to make the Ontario Association more useful, and many other things were suggested; among others, that the local Association might be much more extended or made more useful by making them members of the Ontario Association, if they wished, by paying a little extra fee. A similar line to

this is done in the National Association in the United States. We hope in that way to create a greater interest.

I am sorry to say that we cannot congratulate ourselves on having a large crop of honey this year. In fact I believe it is one of the lightest crops we have had for ten years. I do not remember a time when we have had such a light crop all over the province. I have known partial failures in other years when there has been a light crop in the west, and a better one in the east, but this year it seems to be generally light all over. The honey on exhibition is particularly fine for this season. I do not remember ever seeing any better, and the prospects are that we will realize higher prices. There is no reason why the prices should be lower in the near future. Other agricultural products have advanced, and honey is just as valuable as any of them. We have a growing market; it was thought at one time we would need to cultivate British markets, but we have a market right at home that we cannot supply.

Mr. HOLTERMANN: There is just one point that Mr. Smith spoke of that has impressed me, that was in connection with the prices of honey. I do not think it is a desirable thing for honey to be the price it is at the present time, from year to year. If we had a larger crop we could afford to sell for a great deal less money. For years everything we have required for a living and for supplies and so on has increased in value, but honey has remained at just about the same price. I think that it is within the power of the bee-keepers to raise the price of honey higher than it has been for the last two or three years. If the quality is good, people will be willing to buy it.

Mr. BROWN: I find the people in Toronto are willing to give a good price for a good article if it is put up in a proper manner.

THE HONEY EXCHANGE.

The CHAIRMAN: One man wrote to the Committee, and said he got a half cent more than he did the year before, and another man wrote and said he would have been willing to sell his honey for 8 cents if it had not been for the committee's advice, and he sold it for 10 cents. The committee regret that they cannot have more reports. It would help on the work wonderfully if every bee-keeper would send in reports. That committee work is costing me something. I was in a store the other day that I have been selling to for two years. They said they were right out of honey, but as the proprietor was not in, I had better phone him about five o'clock, when they were sure I would get an order. When I phoned he said, "Are not you a sort of trust or something in that Association of yours? Aren't you the President of the committee that controls the price of honey?" I explained to him how it was, and he said, "A farmer came in here and sold me one thousand pounds of honey for eight and a half cents a pound, and then he got a letter from your committee saying it was worth ten cents, and he would not give me the honey." Then he said, "I will have you down in the Police Court and have an investigation and break the trust." I told him I was sorry about that, and I did not think we had done anything wrong, but I lost a customer; however, I can sell all the honey I have got.

Mr. TIMBERS: Is it necessary to send the honey out of the country? If we get an off year like this, we will not have enough. I have refused mail orders for over 2,000 lbs. that I cannot supply.

Mr. McEvoy: Next year we may get a good crop, and you would not like to sell it at six and a half or six.

Mr. Timbers: It is not necessary.

Mr. McEvoy: If we can ship a lot off it will be all the better for you.

Mr. Evans: It seems to me the lesson of a good crop is that when there is a low crop the bee-keeper should keep his honey and pack it away. Honey keeps from year to year, and every four or five years there is a failure, and that year absorbs all the surplus stock.

Mr. R. H. Smith: I had a little experience trying to get members to join the Honey Exchange. A bee-keeper living west of us produces about 150 lbs., and I asked if he would not join the Honey Exchange, and he said "No, my father belongs to the church," and would not think of anything of the kind.

Mr. Holtermann: I saw a letter this year written by a Government official, who stated that they wanted honey for a certain exhibition which was going to be held, and he stated that he understood that dealers had bought up the crop and were forcing the price up, and that the honey had to be got, and to pay whatever price was to be paid. Another gentleman of a long business experience, said to me, "Is not this a combine; you had better be very careful." I told him that it was not a combine.

The Chairman: We do not attempt to control prices. We simply advise our members what we think our honey is worth, and if they want to sell it at less than that price, they can do so.

Mr. Newton, Thamesford: This has been great help to bee-keepers. I know several that have held their crop after they got the report. I do not think the people in general look upon it as a trust. I know it will have a tendency to keep up the price. A man who is shipping out, always calculates that he is making enough out of the shipment to pay him the difference in the freight rates. It has paid me to ship out to the west, and I am perfectly willing to pay freight rates. I think the funds of the Association have been used in the best interests of the bee-keepers of Ontario.

Mr. Holmes: There has certainly been good and helpful work done for the bee-keepers of this Province in getting out their report. It has always been my wish that this report should be issued as a private bulletin, to bee-keepers only, and if at all possible, it should not find its way into public print. I therefore think that we should exercise the greatest care to have our honey A1 quality, and the fact that it is A1 should be kept to the front always. If we get any inferior honey, we should not sell it to inexperienced people, who do not know good honey; we should put inferior honey up in barrels and sell it to manufacturers.

Mr. Deadman, Brussels: I think it is intended for the bee-keepers only. I have found that it makes it more difficult to buy honey. Last year I bought honey cheaper in winter time than I could in the fall. It would be well for the committee to act with caution, because, if the price is too high, the bee-keeper holds it, and then if he finds that he cannot get the price, he will not be satisfied.

Mr. Newton: I am not in favor of keeping the price to bee-keepers in general. I was very much taken up with the article that appeared in the *Globe* after the report of the Exchange. Several of the business men speaking to me, seemed to be ready to buy and to take in the situation at once. They thought there was not much honey in the market, and they were willing to take the honey at the bee-keepers' price.

Mr. Couse, Streetsville: The longer I have been on the committee the more confidence I have in it. The price set by that committee may be a

cent or half a cent each way, but the committee are probably straight in nearly every case. Mr. Newton has just spoken with reference to the report in the papers. Mr. Craig and myself both went to the papers. We said, we are here for no purpose but what is right. We showed them the reports we got from all over the Province, and said that we did not want to hide that from anybody, we wanted to give it to the people. We gave it to the *Globe*, and the *Mail and Empire*, and that report went out, and it was fairly correct, and the bee-keepers have received the price that the committee suggested. We do not bind anybody to keep their honey; we felt that this price ought to be obtained. This is not a combine, but it is a proper thing to do. A seed firm in Chicago has a man who goes all over the country to get crop returns, and we have a perfect right to do the same kind of thing. When we get a report from the bee-men, we know fairly well the kind of honey that is in the Province. I think the work of the committee has been very beneficial all the way through. (Hear, hear.) We do not pretend to be perfect.

Mr. McEvoy: The price is partly fixed by the outside world. They can lay down honey from Jamaica for 7½c.

Mr. Couse: Buckwheat honey is better than that.

Mr. Holtermann: Mr. McEvoy is perfectly right. You will get logwood honey for that price, but I am not afraid of it in competition with our Canadian honey at considerably less than the Canadian price.

Mrs. Scott: I was going to suggest that this Jamaica honey was not worth more than 6c., and if you buy it at 7½, it does not affect our good honey. Honey sells upon its merits. I think we should send this report to bee-keepers outside our Association. These are the men that generally break the market down.

Mr. Grosjean: The demand generally rules the price. The honey exchange is not doing any more than trying to find what the produce of the country is, and they are only giving advice to bee-keepers and they suggest what the price should be, and this is not more than what the Government does. I have been giving them a monthly report on fruit. Apple buyers combine together, and find out what the prospects of the apple crop are when they are the size of peas, and they set a price later on. I am very proud of what the Honey Exchange has been in the past, and I hope they will follow it up and get in the smaller bee-keepers who do not belong to the Ontario Association. I have great pleasure in moving a vote of thanks to the Honey Exchange for the good they have done in the past, and hope they will continue in the future.

Mr. Chrysler: I second that motion.

Mr. Kirby: I find that the greatest draw-back in my part of the country, are the farmers. When they get any honey, they run into town and dispose of it at a low price, and I think it would be well if we could find some means of reaching these people.

Mr. Holtermann: There is only the one way that can be done and that is by greater activity in the local organization.

The Chairman: I may say our object in putting it in the paper was so that it would reach the small bee-keeper. We have upwards of 200 members in this Association, and there are three or four thousand bee-keepers in the Province. So far as I am concerned, I think it was all right to have it in the paper.

The motion was put to the meeting, and carried.

Mr. G. A. Deadman: I think the wholesale and retail price should be kept confidential to the bee-keepers, but let it be scattered broadcast that there is a scarcity of honey. There is one thing I do commend the com-

mittee for, and that is in fixing the price. Too many bee-keepers make no difference between the men buying wholesale and retail. Wholesalers of Toronto and Hamilton buy honey to sell to the grocerymen, and they have to get it at less price than the consumer.

THE CHAIRMAN: We are glad the members of the Association approve of the work of the committee generally.

THE PRODUCTION OF COMB HONEY.

BY U. H. BOWEN, NIAGARA FALLS.

In the absence of Mr. Bowen, his paper was read by Mr. Pettit.

The essential requisites for the production of comb honey are a good honey flow, strong colonies of bees, convenient hives, and an apiarist who understands handling the bees and hives so as to take advantage of the flow of nectar.

The first of these requisites is beyond our control, except that we should take care to locate our apiaries where there is usually an abundance of nectar-secreting plants and trees, such as clover, basswood, etc. In my location clover is the only source of surplus honey.

The strength of the colony of bees depends largely upon the care it gets after being taken from its winter quarters. A colony that has wintered well, and has a good queen and an ample supply of food, will usually be in good condition for the harvest when it comes.

The hive should be sufficiently large to contain a good supply of honey and yet leave room for all the brood a good queen can produce. It should be easily enlarged or contracted as the occasion may require. The hive I use holds eight Langstroth frames in the brood chamber, which is large enough for the greater part of the year. In the spring, when a colony is building up rapidly and needs more room, I enlarge the hive by adding a half-story super containing eight frames, five inches in depth, being equal to five Langstroth frames, thus increasing the capacity of the brood chamber to thirteen frames.

When the harvest is at hand and the hive overflowing with bees, put on a super of sections. If the colony is in a one-and-a-half story hive, remove the half-story, making sure that the queen is in the lower brood chamber, and put on a queen excluder to keep her there. Put on the sections, and on top of them the half-story super that was on the hive in the first place. The entrance should be the full width of the hive, and about an inch wide during the harvest. After the bees are nicely started in the sections, the super of shallow frames may be taken away and another super of sections put on in its place.

About this time the colony will be preparing to swarm. The swarming impulse is not the great misfortune that it is often represented to be. The choicest comb honey is usually produced by the colonies that have swarmed either naturally or otherwise. But the swarming must be controlled, and I know of no better plan than the "shook" swarming. Shake the bees into a new hive containing five frames filled with wired foundation or starters, as you prefer (my preference is the wired foundation), and one frame of comb to catch the pollen. If that frame of comb contains a quantity of unsealed brood no harm will be done. Put in enough dummies to

fill out the hive. Set the new hive on the old stand with an empty hive body below the brood chamber. This empty body will give the bees room to cluster in, and they are not likely to swarm out next day as they probably would do without it. It should be removed after the second or third day. In shaking the bees I prefer to shake all the bees and give the brood to some other colony to take care of. The sections should be taken from the old hive and placed on the new one.

Where shall we put the sections that we add to a hive that has one or more supers on? And how many supers should we have on a hive at one time? I have no fixed rule for putting on sections. It is largely a matter of judgment, for what is all right in one case may be all wrong in another. I usually put the second super on top of the first, leaving it there till I think it is safe to put it below without danger of the bees stopping work in the first one. The third super is put on top with No. 1 next and No. 2 below No. 1, and so on, crowding, if anything, the lower supers, and keeping an empty one on top in reserve. It is there if needed and if not needed it does no harm.

The sections and foundation we use are two important items in the production of comb honey. The plain or no-beeway section with the fence separator is much superior to the old style beeway section and plain wood or tin separator. I have given both kinds a thorough trial, and am decidedly in favor of the no-beeway section. The sections should be so placed in the super that there will be a fence separator between the outside rows of sections and the sides of the super, leaving a passage-way for the bees on each side, which results in the outside rows of sections being nearly, if not quite, as well filled as the middle ones, and in about the same time—sometimes sooner. I have taken off supers of sections where the only unfinished sections were in the centre rows. Use full sized sheets of extra thin foundation in the sections. The thinnest foundation is the best and most economical to use. A section that is higher than it is wide is better than a square one. The high sections sell more readily and are preferred by dealers.

When removing the filled supers of honey from the hives, bee escapes are very convenient; but it is not necessary to have an escape board for each hive. A few puffs of smoke will drive most of the bees out of the super to be taken off, and then it should be quickly removed. Pile the supers up at the side of the apiary with an escape board underneath, and in a few hours they will be free from bees. The honey should be stored in a warm, dry place if possible. I use the cellar under my house for storing the honey, and keep it dry with a small stove burning natural gas, which is lighted more or less every day while the honey is there. If there is no unsealed pollen in the combs it will not be necessary to fumigate comb honey.

The Italian bees have not given as good satisfaction in comb honey production as a cross between the Italian and the black bees, on account of the manner in which they seal the combs, that of the hybrids being much whiter.

At the close of the honey flow enlarge the brood chamber to its full capacity again.

After having secured a crop of nice comb honey do not spoil it by slipshod methods of marketing. Put the honey up in neat clean cases holding a dozen sections each, having first thoroughly cleaned each section of propolis and carefully graded them. Time spent in this work is well and profitably spent.

Q.—What is the best size of no-bee-way section; which is the right width, 1 3-8 or 1½ inches?

Mr. Pettit: I have had no experience with no-beeway sections, I do not care for them myself.

Mrs. Scott: I have tried both, and I think 1½ inches clear section space is probably large enough. If you make it 1 3-8 inches wide and 4½ inches square, it looks small compared to the regular 4¼ inches solid section. 4 by 5 by 1 3-8 is the best size of section I have ever come across.

Q.—Can as good comb honey be produced from old comb as from clean?

A.—If there is a quick sharp flow, I do not see very much difference, but if the flow is a little inclined to be slow, and if the sections are liable to be left on a length of time, of course the clean combs or starters will give a cleaner section.

Mr. W. J. Brown: Why use dummies instead of the full number of frames and why are fences better than plain separators?

A.—Dummies placed at the outside where there is not likely to be brood keep the brood chambers free from honey, and there should be just enough comb for the queens to put the brood in. It is more important that the honey be crowded in the supers producing comb honey than in producing extracted honey, because we want the sections finished, and on this account it is better to have as little honey in the brood chamber as possible, and the dummies placed on the outside will crowd them to the outside.

Mr. H. R. Smith: Do you find the sections as well finished over the dummies?

A.—I do not find any difference.

Mr. Newton: I do not like to interrupt, but there is just that question there of the fence separators, or no-bee-way separators, such as Mr. Bowen mentioned in his paper, that I have been thinking about. Mr. Bowen was in favor of no-beeway separators.

Mr. Pettit: No-beeway sections and fence separator.

Mr. R. H. Smith: These fence separators are made some with cleats and some without.

Mr. Pettit: There is likely to be a ridge.

Mr. D. A. Chrysler: Does that spoil the honey for sale?

A.—No, there is room opposite that space where they can build out the honey just a little bit.

Mr. Holtermann: The wire cloth separator leaves you without any ridge, and is, I think, the best.

Mr. John Timbers: Is not this wash-board honey more liable to have the sections broken?

Mr. Pettit: Yes, if there are no-beeway sections. I prefer to have bee-way sections.

Mr. J. M. Switzer: I used fence separators this last winter for the first time, and I find that the combs are just about as smooth as ever. I think we had just as good comb honey this season as any other season.

Mr. Holtermann: Was the flow comparatively light?

A.—Yes, not more than half.

Mr. J. M. Switzer: In the short experience I have had in one season I am very much in favor of them. I think 1½ inch section is a little too wide.

Mr. John Timbers: Would there not likely be more wash-board honey in a good season than there would be in a poor season like this?

Mr. Holtermann: Yes, I think so.

Mr. J. F. Switzer: I think a slack ¼ inch would be better and I do not think you will have any trouble.

Mr. R. Lowey: I have used some separators with a few holes bored in, and with even one hole opposite the sections, there would be a ridge there, and I think these wash-boards, as you call them, spoil the look of the sections.

Mr. Pettit: Did you ever try 3-16 holes?

Mr. H. R. Smith: 3-16 is the right size; I have used hundreds of them.

Mr. D. A. Chrysler: I had some difficulty in using these plain sections at first on account of them having this wash-board appearance. If you put another super on, you do not get this. It is too much crowding; you are not giving them room enough; that is the trouble.

Mr. Adams: In seasons like the last, I found no-beeway sections had more or less of the wash-board appearance.

Mr. Pettit: Did the separator section come flush with the top?

Mr. Adams: Yes, flush with the top of the inside of the section.

The Chairman: I intend to ask Mr. Chrysler if he tried the wire separator.

Mr. Chrysler: I did, but it was too late before I got them on; but the results I had with them were very good.

Mr. Holtermann: I had one hundred of the wire separators made. Mr. Betsner said it was absolutely necessary to have perfect workmanship and absolutely correct spacing. Perhaps some of you saw the illustration in *Gleanings* in connection with the Betsner separator, which was very discouraging. These wire separators are good for fifty years if you take care of them, because you can put them into hot water and clean them absolutely.

Mr. W. H. Kirby, Oshawa: I generally use a single tier with tin separator which runs right through, and I find the bees will store just as much honey. I look upon these new things as mere fads.

Q.—Is it a fact that black bees, or hybrids, will cap comb honey whiter than the Italians?

A.—In my experience it is.

Mr. Brown: Black bees produce the best comb honey; I have had them side by side with the hybrids.

Mr. R. Lowey: That is my experience with hybrids.

Q.—Should the bee escape be placed in the centre of the board, or at one side, to be most effective?

A.—I think probably in the centre would be best. The only kind I have used is in the centre of the board; the bees want to get down to where the brood is, and this being above the brood would naturally draw them down. The best escape-board I have used is one made by Mr. Smith. I find that it cleans the super better than a single Porter escape.

Mr. McEvoy: I do not care what escape is used, it depends on how you use it. If you will raise the super a couple of inches they do not know they are cut off, and will go through the next morning and there will hardly be a bee there.

Mr. R. Lowey: Keep hybrids, Mr. McEvoy, and they will know if you disturb the super.

Mr. J. F. Switzer: I have had bees leave the comb honey super in four or five hours after putting on the escape, perhaps four escapes in the board.

Mr. M. B. Holmes: I have had escape boards with the escape at the side, and I find they clear more quickly.

The Chairman: I saw Mr. Switzer's bee escape, and I thought it was a good one, and I am going to make one this winter. It is an invention of his own, and it is very simple and very cheap.

Q.—Why does not contraction of the brood chambers induce swarming again?

A.—It depends on the season. If the season lasts long enough, it does.

Mr. PETTIT: Mr. Bowen says he prefers foundation and one comb full of brood. The bees work in the supers, and by the time the brood chamber fills up again, the season is so near to the conclusion that they do not swarm again.

The CHAIRMAN: I think that can be accomplished by hiving on starter and giving room above. If you contract them, it forces them to swarm, but if you hive them on starter, they will spread over them. I would not care if you put an empty hive below, they would go right up and start on the foundation starters, and then you put on your sections, they will start right into them, because they will accept them more readily than they will the space below. Some people put a section that has comb in there to bait them, and that is what I recommend rather than dummies.

Mr. NEWTON: I am glad he said that; I knew he would do it. It is the same old thing, we have done it for years and years. Mr. Pettit or myself will never give up that; the dummy is far ahead of the other plan.

Q.—How do you use dummies with success?

A.—The only way I can get at the meaning of this question is that someone did not understand what dummies are. They are an apparatus cut the size and shape of the comb, and placed in the brood chambers at the outside. They are put in place of the combs so that the brood chambers will be contracted that much. Mr. Bowen has an eight frame hive, and he puts three dummies, I suppose two at one side and one at another, and leaves the frames, and these dummies are placed inside of the brood chambers, and it is contracted that much.

Mr. TIMBERS: Would not a division board answer the same purpose as a dummy?

A.—No.

Mr. BROWN: We adopted Mr. J. B. Hall's plan of driving staples into the side of the dummy so as not to have any further spacing.

Mr. PETTIT: That is the way I space on my frames, with staples.

Mr. NEWTON: Why place an empty super on top of a full super for comb honey?

Mr. PETTIT: The reason for that is that the usual plan is to place the empty super under the finished one. That is what the bees prefer, and they will go to work a little better in that way; but when we do that they practically work in the empty top until the empty super is brought on to the same stage of completion, and then they go on to complete the work together. If the honey flow continues, you have the two supers finished, but if it does not continue, you have them unfinished.

Mr. NEWTON: Do you recommend that through the whole season?

A.—No.

Mr. R. H. SMITH: Won't they swarm much quicker with full sheets of foundation than with starter?

A.—Yes.

The CHAIRMAN: I am going to ask Mr. Miller to answer the balance of the questions.

Q.—Is an eight, ten or twelve frame hive best for comb honey?

A.—I would take the smallest.

Q.—Will the last swarm, swarm out with the last virgin queen leaving the hive queenless? And why?

A.—I don't think I can offer anything on that.

The CHAIRMAN: I have known a colony to swarm that way, with only one queen and leave the hive perfectly queenless. I don't know why they do it, unless there is an abundant flow. Perhaps they are crowded, but I know it has been done in my experience.

Mr. JNO. TIMBERS: Did all the bees go with the queen or did they leave half behind?

A.—I think they left enough to cover the comb.

Mr. HOLTERMANN: What evidence have you that they did that. Did you see them swarm out and did you go to that swarm and find that there was another queen as well as your young queen?

The CHAIRMAN: Yes, immediately after they swarmed. I have known them to have only one queen, and I have seen them swarm, and I wondered why, as there was no queen left and nothing to make a queen.

Mr. HOLTERMANN: Were they hybrid bees?

The CHAIRMAN: My bees are hybrids, some Italians.

Mr. JNO. TIMBERS: I had a swarm come out in the same way, and I put them back, and the next day they came out again; I thoroughly examined them and finally they decided to stay. But the queen never did any good.

Q.—What strain of bees is considered the best for the production of comb honey?

A.—For instance capping qualities, I would say hybrids. You occasionally get Italians that will cap white, but others cap with a water coloring.

Q.—Shall we winter inside or out?

A.—It is a matter of choice and local conditions. I prefer outside wintering. I can do it outside with less inconvenience than I can wintering inside. I used to prefer inside winterng when I had only one yard, but I find the results are better in the spring from outside wintering.

Q.—Have you a double wall hive or a single wall hive?

A.—I use a case for four colonies. Not a double wall, just a single hive, four in a bunch.

Mr. PETTIT: Do you leave the bottom board tight and the cover on?

A.—Yes, just tight.

Mr. QUANCE: Do you ever find the entrance covered up with bees?

A.—No, I rake the entrance out if the snow blocks it up.

Q.—How do you fix the outside entrance to keep the snow from packing?

A.—I think it would be better to have a storm door fit over the entrance. I have studied that out for some years but have not perfected one to suit me.

Q.—Have you had any experience in wintering bees in a trench covered with straw and dirt?

A.—I have had no experience with that system of wintering.

Mr. R. F. WHITSIDE: I tried that a number of years ago when I had about six hives; I put them in just the same as potatoes. I dug a hole three feet wide and two feet deep, and I put straw and boards and dirt, and then straw and boards and more dirt, and I put a gas pipe up through for ventilation, but the bees stopped them all up. However, they came out as lively as bees ever did in my experience.

Mr. HOLTERMANN: I tried six or eight of them and they came through all alive, but they were a poor success, and I do not feel like repeating the experiment.

Mr. R. Lowey: I have seen two cases of that and I advise you to take poor stocks to try it.

Mr. Timbers: I tried that with a couple of swarms. They were good when I put them in and the trouble was they came out too quick. When I wanted to take them out they were all out and gone.

Mr. R. F. Whitside: Next year I tried eighteen, and I boarded them all up inside and the lower twelve were very easily carried out. On the top section they managed to pull through. I suppose I should put one report against another. The first time they were all right and the next time there were twelve gone.

Mr. Holtermann: It is the regular practice in Russia to bury bees in the ground.

Mr. Timbers: The outside atmosphere would have something to do with it. The year I tried it we had a mild year something like last year.

The Chairman: My experience is that it would not be a very good thing to recommend to anyone.

Mr. W. J. Brown: I have known it to be tried in our section of the country and it proved a failure.

Q.—Are not the forms, enquiring regarding crop reports, issued too early for many bee-keepers to give correct information as to a basis of prices?

A.—I do not think they could be issued too early for the benefit of bee-keepers for market. The trouble is the other way. We need that report just as early as the honey comes from the hive.

The Chairman: It would be better if the beekeepers would not be so particular for having it just accurate. Do it as well as you can and send in a report. I think some beekeepers are so honest that they do not like to report until they have it all weighed up and know exactly what they have got. That is a mistake, as we do not want to know just to a pound or two.

Mr. Holtermann: I quite agree to what Mr. Sibbald has said as to the need of estimating rather than waiting to know the exact amount. There is no use writing a man what his buckwheat honey crop is going to be about the 1st of August. And I would suggest that there be an attached slip which can be torn off and used as a fall report.

Mr. W. J. Brown: Owing to the fact that the Department of Agriculture has got very good assistance, I think it might be gotten some way through the Bureau of Industries, and we might get these reports distributed among beekeepers, the same as they do their reports with regard to fruit, grain and crop of that kind. Some people think it is a combine, but if it came through the Department no one would have any hesitation in replying.

Mr. McEvoy: I think that is the most sensible thing I have heard. If the Government take hold of it, the people would have more confidence in it, and there would not be that feeling that it was a sort of trust or combine.

Mr. E. Dickinson: The Department would not have anything to do with fixing the price.

Mr. Holtermann: That is done every year, and has been done for a long time; but we would have our honey sold before we got the report.

Mr. Evans: I think the present system is working satisfactorily. The Government send out their report as to the amount of honey produced. I answered the question, but did not estimate the quantity of honey. I think that is a question for the beekeepers themselves. I think they are the only people who are entitled to have that information. I do not think we need worry about buckwheat honey; it is not of much consequence.

The CHAIRMAN: I do not produce much buckwheat honey, but I know some people enjoy buckwheat honey just as well as clover honey. In fact, I have one or two customers who prefer it.

Mr. EVANS: I never knew a child who had a taste for whiskey, but I believe there are people who have acquired a taste for it, and I think it is quite possible you may acquire a taste for buckwheat honey. If I had to eat buckwheat honey, I would rather do without honey altogether. My bees will not gather buckwheat honey. I have bought buckwheat and given it to my neighbors to sow, but my bees will not gather it. I think the least we have to do with a handing our work over to the Government the better. I do not think it is necessary to hand it over to the Government. I am a little doubtful about having this information sent broadcast throughout the country, and I think it is a great mistake to put in the amount of honey. It is all very well when there is a failure, but when there is a good crop, I do not think it is advisable to shout it from the housetops.

Q.—Can colonies coming out of winter quarters queenless be properly queened in the spring?

A.—From my own experience, I will say no. You can send and get queens and introduce them, but I do not think with profit to the producer. It is too early in the season to handle a colony in that state profitably.

Mr. WM. MCEVOY: If you had a strong colony and they lost their queen, would not you try to get a queen?

A.—No, I would unite it with a colony that had a queen but few bees.

Mr. HOLTERMANN: I do not like that answer to go into the report unchallenged. If I have a stock of fertile workers I never want to trouble them. I just simply shake off from the combs and that is the end of it. But in the spring of the year I have saved many a colony by having young queens come on and putting them in. I rarely ever unite stocks. I have bought queens in the south and had them come on in April, and saved quite a few colonies by doing it, and I think it paid me to do it.

Mr. MILLER: I am not saying that it cannot be done; it depends upon the amount of work and the expense you generally go to. We answer a great many of these questions from our own standpoint, and the way we believe to be most profitable to ourselves. To a man with a few colonies and wanting more, I would say get your queens from the south, but if more than 100, 200, or 300 colonies, I would never think of ordering a queen for the colony; I would raise my own queens; I would never think of shaking off a colony of fertile workers. I do not allow them to dwindle down until they are a handful. As soon as I find a fertile worker I take my hive off and separate the two brood chambers, and jar the bees out on the ground—I can do it in the time I am telling you—and I place the colony on the stand ready for the winter.

Q.—If you had a good strong colony in May without a queen, you would shake this into the next colony that had a queen?

A.—Yes, instead of re-queening that colony, I would unite it with another.

Q.—Why not introduce a new queen?

A.—Because there is no profit in it. If you have a small number of hives it would be all right to introduce a new queen.

Mr. MILLER: We are talking about colonies coming out of winter quarters.

Mr. MCEVOY: You are right, I thought it was in May or some time in the spring.

Mr. HOLTERMANN: Certainly never disturb a colony when you come on to apple bloom. It seems to me there is more work in uniting that colony than there is in putting a new queen into it.

Mr. MILLER: In uniting a colony, I simply bring one up and set it practically on top of the other. They will unite themselves. I simply carry my colony over to the one I wish to unite it with.

Mr. HOLTERMANN: I find you can introduce a queen very rapidly if you do it very soon; if they are out it is very hard to introduce a queen, but if they have been in the cellar I find no difficulty in introducing the queen.

Q.—In taking a swarm on starters is it wise to put on queen excluder between section super?

A.—I have always practised it. If there were no bee comb in the sections I would certainly put on the excluder.

Mr. PETTIT: My experience in using queen excluder is that I am putting sections on regular stock. If I put on the queen excluder then, and a section on the top of that, in my experience it hinders the bees going up; but if there is no comb in the section, only just foundation, I put the section on without queen excluder.

The CHAIRMAN: Where shallow hives are used the excluder would be necessary. A deep hive would not need it so much because the bees would go further down on the comb.

Mr. PETTIT: You are not figuring on the rim of honey on top of the comb.

Q.—How do you like an engine for extracting?

A.—I may say that I have had one season's use of a gasoline engine for running an extractor and I like it very much. The fact that I can fit it for a gasoline engine gives me advantages; I am certainly pleased with it.

Mr. EVANS: What is the cost of the engine?

A.—$145. It is a 2-horse-power engine.

Mr. HOLTERMANN: I was at Medina, Ohio, recently, and the people there sold me a gasoline engine which they guaranteed to do good work; the cost of it with connections was $65.

Mr. MILLER: Mine was for installing outfit complete. I have a shaft and double belt running on three pulleys. I use the National Harvester.

Q.—There would be duty on the Medina machine?

A.—Yes, 30 per cent.

Q.—If an empty comb is put in brood chamber when hiving, on starters, will it be necessary to put on a queen excluder?

A.—With my systems I would do so. Mr. Sibbald spoke of the advantages of putting it in large deep frames. I presume that would be the case. I have always put the excluder on for comb honey and I keep it on.

Q.—What about the Alexander method of building up weak colonies in spring, is it a good one?

A.—I cannot say as to that. It is a plan more adapted to the Chairman's system than mine; I never tried it.

The CHAIRMAN: The system is to put two colonies one on top of the other with the queen excluder between them. Set the weak colony on top of the strong one. I put a queen excluder on top of the strong colony, and then a weak colony on top of that. Choose a colony right beside the one you are moving. Do not carry the colony from the other side of the yard, because if you do you lose the flying bees.

Q.—When would you do that?

A.—After they get some brood.

Q.—What is the best time to put bees in the cellar in the vicinity of Toronto?

Mr. KIRBY: Perhaps some Toronto man can answer that question.

The CHAIRMAN: From the 15th to the 20th of November would be my advice.

Q.—Would an uncapping machine be a very great advantage?

Mr. MILLER: From my own standpoint it would be of very great advantage. With an uncapping machine, and my gasoline engine, I could almost sit down during the busy season, provided the capping machine came up to my requirements.

ADDRESS.

By Hon. NELSON MONTEITH, Minister of Agriculture, Toronto.

I regret very much that my time has been so occupied that I have been unable to be earlier at your sessions. However I am here, and I am glad to meet the men who are forwarding the bee industry so well in this Province. I am sorry to learn that the past year has not been altogether a banner year in the way of honey production. However, there are certainly climatic conditions that sometimes affect results to such an extent that our labor is not always at fault. I am interested in being among you, not only for the good fellowship I have met at your hands, but to gather from you what you believe could be done in the way of legislation to advance the bee industry of Ontario. Last year we attempted some slight modifications of the legislation bearing upon your industry, and I believe that the coming session may see some other changes if you may see fit to urge upon the Government and show your conclusions are satisfactory. We are but your servants in carrying out what we believe to be in the interests of this industry.

I would like to gather from this, your annual meeting, something that would be fairly definite as to the views of the bee men of this Province. I do not profess to be a bee man in the sense of being able to advance any ideas, particularly in the way of legislation; however, I do know regarding the interests that you have in mind, that I shall only be too ready and willing to further your well-thought-out desires in the matter of legislation bearing upon this great industry. I think it is unnecessary for me to speak at any great length as to what in my mind should be done for the honey interests of Ontario. I tried to impress upon you last year that I thought the beekeepers of this country were not altogether alive and aggressive enough in the way of putting their products into the hands of the people. I still believe that what I said at that time was well founded. The value of honey as a food is little appreciated, and I believe there is a good deal of missionary work required on your part to put honey in its proper place in the bill of fare of the people of Ontario.

Not only that, but there is the way of marketing your goods. In fact, that seems to be one of the failures of the people of Ontario—not presenting our productions in the most attractive way. However, much has been done along this line, and I think very little may be said. This Province is rapidly growing in population. Bee-keeping to my mind, is something that is not wholly confined to those that reside in the country. However, you recognize the difficulty under which those labor who attempt to keep bees in crowded centres. There have been certain happenings in our courts during the last year that add to your responsibility, and that we cannot overlook in

the matter of taking care of bees. I do not know that I should further occupy the valuable time of this Association. I came here to learn as to your desires, and to judge as fairly as I can, how far they may be met.

The matter of inspection is something that has been changed somewhat. We have assumed direct control of that, and I am not prepared to say as to whether it has been an advantage or not. It is largely for you to say. However, I think that during the past year or two the complaints in this respect have been fairly met. We made every effort, so far as the Department was concerned, to meet with the demands that were put forward. I think it is only fair to you to say that there is one season of the year in which the necessity for the attendance of the inspector is of the greatest importance, and that season is somewhat limited in its duration, and I believe the work might be furthered by trying to meet cases that arise during that season of the year. Whether that might be done through an increased number of inspectors or some other method, I am not exactly clear about. I think possibly some suggestions you may give from this meeting may strengthen our opinion in that regard. There is a large territory to cover and for that reason it requires considerable effort. I am glad to be with you, and to know that your organization is such a live organization. I hear at a distance sometimes of your doings. You have some of the pugilistic qualities that endear the Anglo-Saxon to humanity the world over. You do not always agree to agree, and sometimes our best ideas are brought to the surface in that way. I wish continued success to the Association, and trust that another year nature will be more kind to us than it has been in the past.

The CHAIRMAN: We are glad to have the Minister here, and we appreciate the efforts of the Department in helping the bee industry. Some of us have had occasion to meet with the Minister and the Deputy Minister, and I feel assured that our interests are theirs. They are taking an interest in us, and they are going to help us, and I think that is only right. I saw some one the other day who said that the bee-keepers were the only class of people who could steal honestly, and it struck me that this is quite true. Honey is a secretion that if not collected will be wasted, and every year there is a great wealth wasted in the country where bees might be kept. I moved into the district I am in now, and the first year I got somewhere about 20,000 pounds of honey. I do not know that any of that would have been gathered if it had not been that I put bees there, and that is only an example of many places in the Province; so that the Department of Agriculture, by encouraging the bee industry, will help the wealth-producing elements of this country. They talk about digging mines and getting minerals out of the earth. In our business we do not have to dig at all; it is right there for us.

The foul brood question is a burning one. That disease alone has been a loss to me of $2,000 for the last two or three years. I got foul brood when I had 300 colonies of bees. I had to reduce them to 150, and I have had just as much work with the 150 colonies; it has taken me about three years to get them back to 300. I can mention 20 apiaries where foul brood exists within 20 miles of where I keep bees. The matter of more inspectors will always have my hearty support. I am sure the Minister would like to hear from any of the bee-keepers here a few remarks on the questions he has talked of in his address.

Mr. McEVOY: The President said he lost $2,000. I could have saved him that money. Mr. Hall, of Woodstock, had foul brood in his apiary and I saved him from great loss. I put it out of his apiary, and I could have done the same for the President.

FOUL BROOD INSPECTION.

The following communication was read by the Secretary:—

Toronto, October 31st, 1906.

Dear Sir,—Under instructions from the Minister, I beg to lay before you for consideration by your executive, and if thought advisable by your executive, to lay before the members at your next convention, a proposition whereby we think the relationship of this Department with the Association may be materially improved, the usefulness of the Association extended, and the interests of the bee-keepers better served.

We have found that it has been to the mutual advantage of the Department and other associations to have the relationship strengthened, and the work of inspection directed from the Department. You will recall that at the last session of the Legislature provision was made whereby more than one inspector might be appointed by the Minister, and the work of inspection directed from the Department. Owing to the lateness in the season when this bill became law, and also owing to the fact that your Association had already selected an inspector, it was felt advisable to continue your recommendation, and the work was begun somewhat late in the season.

We undeastand that the period of best inspection is somewhat short. and that, therefore, it might be advisable to divide the Province into six districts as follows:—

1. Lennox and Addington, Frontenac and East. ,
2. Victoria, Peterboro, Northumberland, Durham, Prince Edward, Hastings.
3. York, Peel, Simcoe, Dufferin, Ontario.
4. Wellington, Waterloo, Perth, Huron, Bruce, Grey.
5. Norfolk, Brant, Oxford, Elgin, Kent, Essex, Lambton, Middlesex.
6. Wentworth, Lincoln, Welland, Haldimand.

We think that it would be practicable to secure a good man for each one of these districts. In making the selection, the Minister would naturally consult with the officers and directors, as he would desire to appoint men who would be well informed and carry on the work with the approval of the Society. We would suggest, however, that the services of Mr. McEvoy be retained, and that he be given section number six, providing he would be willing to continue. This section is in the vicinity of his own home, and he would also be available for referring to him any points which might come up in connection with disputes in other districts. While we have in mind other bee-keepers for the other sections, it is not necessary to name them in this connection. It is the principles of the work and general lines of division that we submit to you for consideration.

This would necessitate a larger grant than we have at the present time. The Minister is inclined to think that next year a total appropriation of $1,200 would be sufficient, as the inspectors would not have to travel so far from home, expenses would be lessened, and we should be able to cover a much larger area than has been done under the old plan.

In the next place, we have thought that, in order to carry out his work and keep it in direct touch with the bee-keepers, it might be advisable to have the secretary of the Association located in the Department. We are not anxious in the Department to monopolize any of the work or privileges of the Association, but if you think it would not interfere with the work of your Association in any way, but rather improve its working, to have the secretaryship here, we beg leave to say that that can be arranged. The Sec-

retary of the Fruit Growers' Association, Mr. P. W. Hodgetts, is an officer of this Department, and we understand that he would be willing to take the secretaryship of the Bee-Keepers' Association also. But that is a matter which we do not wish to force upon you in any way, but submit to you for consideration. You may consider the question with the utmost freedom. Mr. Hodgetts is not seeking it and we are not unduly urging it. We would hope to bring the work of the Association into closer relationship with our other branches of work, more particularly the Farmers' Institutes, and it is just possible that some improvement might be made to the advantage of the Association and of the Institutes.

Please have his matter considered by your executive, and oblige.

Yours very truly,

(Signed) C. C. JAMES,
Deputy Minister of Agriculture.

A conference was held on the changes proposed in the foregoing communication, more especially on those relating to the matter of foul brood inspection. The discussion was full and free, and, on the whole, of a friendly nature.

Hon. Mr. Monteith, in closing the conference, said that as head of the Department of Agriculture, he wished to be given a reasonably free hand. It was his aim to keep the Department as far as possible from mere party control. (Applause.) He looked to the various agricultural associations for a large measure of co-operation, and felt persuaded that the bee-keepers of Ontario would also give him their assistance regardless of political feeling. He complimented Mr. McEvoy upon the good work he had done in the past as inspector of foul brood, and believed that both of them could still work heartily together. The Department intended to utilize the best ability procurable to develop agriculture in Ontario. (Applause.)

WINTERING REPOSITORIES.

By William Couse, Streetsville.

My intention was to have taken up repositories I have seen, starting from the first time I knew anything about bees, and that was in the good old brimstone days, when every boy in October could smell brimstone for three miles. Every time bees were taken up at our home every boy in the neighborhood would know it, and he got there and got some of the honey. One particular repository that I recollect from boyhood was a pine log about six feet long, with a hole half way up in the centre as an entrance. At that time we had three hives made from pine lumber lined with straw inside. Where the difference was between that log and these hives was a question. That hive was supposed to winter for a good many years and never fail, and it did so; and as boys, we expected that hive to last forever. The conclusion that seemed to follow out from the whole system of wintering is that dampness perhaps is the greatest cause of failure in wintering. I did not know anything about bee-keeping then, but if you think of that log, there was always ventilation; it stood out right open. A few years after this my experience commenced, in seeing wintering repositories from those that were engaged in the movable frame hives. They were the first wintering cellars, and were not what you would call dry cellars, water lying in many of them.

I remember once seeing Dr. Tom's cellar when it had a great deal of water in it for quite a length of time, but his bees came out well. I would not say it was a damp cellar, but water was there for a short while, and finally drained off. It was on a hill. I remember another instance. A man who knew very little about bees, bought them late in the season, and in order to winter them, he put them in a glass house and he fed them every day. He said if they would not take it any other way, he would throw it over their backs; and he did so, and the consequence was he did not have bees in the spring. In a few years I went to Beeton, and the bees there were wintered in sawdust buildings packed from ten to eighteen inches with sawdust all around double doors. Some of those buildings were provided with a floor in the bottom and some without. They occasionally got somewhat damp in the bottom, particularly those that had no floor, and if there was any loss it was in the bottom row. I moved away from there and went into cellar wintering again. I came to Streetsville, and we wintered in a cellar with average success. A few years later I went into cellar wintering for myself at Meadowvale, but we had a good cellar and it was successful. We got our bees burnt there, and having no cellar we used a sawdust house, and the bees wintered fairly well. From all I can see, I must say that where the bees have been kept dry there are numerous ways of wintering them successfully. I remember going out to a farm on the centre road from Streetsville, where a man had a bee house like an ash house, and he had a box hive without bottom sitting on a trestle with a frame under it. The bees were in an open building 8 x 10, and he wintered them in that way for years successfully. It was not the heat, it was the dryness; I cannot think of any other reason. Since then I have done more or less wintering outside. When the bees were covered with snow to a great depth and kept damp, they did not winter as successfully as when kept up clear and away from dampness. Unless they are kept high and dry they are not so successful. I find that where the bees are wintered inside when you take them out not too early and set them down and cover them up, they are apparently better than those wintered outside. These last two years I noticed particularly bees that wintered in a cellar and were put out carefully, were in a better condition when the honey flow came on than those that wintered outside. I am satisfied where a man has a good cellar, conveniently situated, it is economical to winter inside. Last spring I put out bees at different times, and I found those put out first were not to compare with those put out later, as they seem to start breeding and afterwards dwindle down. Those that are put out late continue right through. This last spring, the bees that wintered outside were fine and strong, and those that wintered in the cellar were perhaps not so strong. I set some out on the 25th of March, and some the middle of April and some the 23rd of April. Those that were set out the month later were in a much better condition. I believe a man who has got a pretty good cellar is well situated. I do not think anybody could winter bees in a damp repository, but I believe they can winter them in many other ways.

Mr. Smith: We have had some experience in wintering in various repositories. Going back twenty-five years ago, our first repository was simply a blanket and the bees were packed in chaff. This was in Muskoka, where the winters are cold. The bees wintered all right. We tried a dry, sandy cellar, and it would save packing; but our experience was that they did not winter so well in a cellar, and at the time we did not know why. Of course, I now know the reason—it was dampness. We moved to Bracebridge, and had a special bee house built, and a special cellar, but before the cellar was

finished, we had to put the bees in, as the winter came on. The frost got into the cellar and, although it was a dry one, we lost more bees than we did any other winter. They were dry enough, but the temperature was too low, and it was just the same as a refrigerator. A neighbor farmer had bees, and he took very little care of them, and left the hives on a bench at the end of the barn, without any protection, and they wintered perfectly, although the temperature went down to 45 below zero. The extreme cold did not last more than a few days. Another reason why they wintered so well was because they were in old combs. We built another cellar, and put them under the house. We had a big stone cellar the full size of the house. We put the bees into it, trusting that the water would not get it. We did not have a drain. There came a thaw in January, and the water got in, and we had to bail out the water to keep the bees from drowning. They never wintered better. It was a mild winter, and I think the water purified the air. A neighbor in the next street had his bees in the cellar under his kitchen, and the bees came out in perfect condition. Mr. Shultz, of Tilbury, put his bees in a cellar and towards spring the water got into the cellar, and when he looked to see if the bees were all right, he found the hives floating around on the water; but they came out perfectly, as there was room enough for the bees to crawl out of the reach of the water. I have noticed when bees are in a cellar that the bees on the lower rows will never come out as well as those above, if the temperature is low. When the temperature is high, they all come about alike. An average temperature of 45 to 48 degrees, we have found to be a very good one, and water running through the cellar is no detriment if the temperature is high enough. I think the reason why bees do not winter so well in hives out in the deep snow is because the entrance gets blocked up and the moisture is retained in the hives. We have found that the cellar is the best method for wintering in this climate, and if the cellar is kept too warm, they will start breeding more or less before you can set them out. If they start in February, and you set them out early in March, they do not dwindle, for the simple reason that there are young bees coming to take the place of the old ones.

Mr. Holtermann: Three years ago I was attending a Farmers' Institute meeting and had supper with a farmer, who took me out to his bee yard to look at some stacks of bees that had been wintering in chaff hives. The hives had upper stories on them, with just the ordinary roof. They had no packing in the upper story, yet these bees had wintered successfully through that very disastrous winter. I attributed it to the fact that they had been kept absolutely dry.

The Chairman: You have heard of the fool's luck.

Mr. Holtermann: I have never had it. I think the first requisite is a dry atmosphere. I have no objection to bees brooding in the cellar, if they brood late enough, so that the young bees are hatching when you set them out. They immediately begin to fly, but where they brood earlier they disturb the colony.

A Member: If it is desired to have them brood earlier, how would you start them?

Mr. Holtermann: I did not say it was desirable, I said I did not object seriously to it.

Mr. Hershisher, of Buffalo: If it is desirable to have young bees coming on to take the place of the old ones, then I think it would be a good plan to set the bees out late, and then you have a good temperature to start them in. It has occurred to me that if we were to put water where the bees could get at it, that it might start them to brood. I do not think it is well for

the convention to get the idea that water in a cellar will make the cellar dry. You all know a cellar that has water in it is supposed to make the house unsanitary. If the house is kept warm, I do not think dampness in the cellar will do any injury. I would think dryness in the hive is the best thing you can have. The colony should be large enough to store up warmth to maintain an even temperature, that is all the good there is in a chaff hive. You know that a large body will give out its heat gradually and not cool off quite so quickly as a small body. A hive with thick walls has the property of giving out the heat gradually. When we had a disastrous winter three years ago, I found the three story hive with bevelled edges had no winter protection at all, as the queen excluder had been left off, and yet the colony was alive; there was nothing but the lid of the hive over the upper story and the queen excluder. The following winter was a very severe one for me, and the colony of bees that wintered best was in a simplicity hive, and the hive set right flat on the bottom board with a sort of V-shaped entrance. When I took the bees out of a snow drift I found the entrance clogged with ice, and I had to pick it out with my knife, and when I cut it open the water floated out. It was thoroughly sealed with ice that held the water in there, and that colony of bees was the best I ever remember of having, and I have got the queen yet. They were apparently asleep when I opened them up.

Mr. Byers: I suppose any bee-keeper can go home and say there is no use having a good cellar and having box hives. However, I do not think any of the gentlemen would winter 300 colonies of their own in the way that has been mentioned here. Wintering outside in such an exposed way is done at the expense of stores. I had a hive that stood six winters; the hive was made of inch lumber with entrance one inch by five. There was a check in the timber and I could look in at any time and see the bees. It was a twelve frame hive thirteen inches deep. Really strong colonies with abundance of stores will winter almost under any conditions, but they will use about a quarter more supplies than colonies of the same size that are protected with chaff. I have never lost a strong colony except where they starved to death. I see no trouble in wintering a good, strong colony, provided you can give them lots of stores.

Mr. Lyons: Do you keep your doors shut?

A.—No.

Mr. Holtermann: The entrance would go half way up to the top of the hive?

A.—I mean the area, I do not mean the vertical entrances.

Mr. McEvoy: Mr. Couse spoke of giving them plenty of air and Mr. Smith spoke of giving them ventilation.

Mr. Smith: I did not explain that. Of course these hives were packed in leaves from this opening at the rear end of the hive, so that the cold air could get through that bagging but very slightly.

Mr. McEvoy: I do not want more than four or five inches of leaves on top. If I was in Mr. Smith's country I would winter outside.

Mr. Holtermann: Is it not a point as to whether these young bees get to fly early or not?

Mr. McEvoy: They disturb the hive.

Mr. Smith: Have you examined them to see?

Mr. McEvoy: I could tell any hive in a yard without looking at it.

Mr. Holtermann: How do you tell?

Mr. McEvoy: By the entrance; you could tell by the sound.

Mr. Hershisher: Is it true that bees have got to have water in order to rear brood?

Mr. McEvoy: No.

Mr. Holtermann: Some of the German writers advocate giving bees water in the winter time to keep them quiet.

Mr. Miller: Both Mr. Smith and Mr. McEvoy mentioned that they consider it necessary to give upward ventilation; for some years I have wintered without upward ventilation.

Mr. Holtermann: I have had grave doubts for several years as to whether I was doing right or not. I used to winter with the covers off and cushions or felt above the quilt, and for two years I have wintered with the covers on, but raising the hives at the back. I have them in a good cellar.

Mr. Hershisher: I should say Mr. Holtermann was doing a wise thing, because he only lost six hives out of 300.

Mr. Holtermann: I have wintered with a loss of less than that, but I do not think I have reached perfection. You should not lose a colony if you would put them up properly, any more than you would lose one sheep out of a flock.

Mr. Brunne: I gave up outdoor wintering entirely. I believe the cellar is best. I have three rows in my cellar which is on a hillside, and I think that it is a proper place to select for a cellar. It should never be on a level. I have found that dampness is needed to winter successfully, so as to allow a certain amount of dampness to come through. I simply take the covers off and leave the honey board on. I do not use any quilts; I put in two little wires to keep it on so that it won't work off, leave the bottom board outside, then put them on scantling, and leave an eight inch space between each of the hives, so as to leave room. I have a view any time in the winter, and can see what each hive is doing, and feed them if they need feeding. I have never lost one hive. I use an eight frame hive, and never take out an empty frame.

Mr. Pettit: Did you nail your honey board down tight?

A.—I never like to have them nailed down so that the air won't come through the cellar and through the hives.

Mr. Holtermann: When you set one hive on top, the two hives constitute a bottom board practically. I saw a lot of hives wintered that way in Quebec Province, and the man was very enthusiastic about it.

Mr. Brunne: In the spring I simply lift them out, put the bottoms under, place them on the stand, and I have no more to do. I lift them on to the bottom board in the cellar, close up the entrance and leave it closed up after I get them out until they quiet down.

Mr. Grosjean: I have wintered with the top covers on and without covers at all. Some years ago I wintered with the covers on, and I found there was dampness, so I took the covers off. I wintered somewhat in the same plan as Mr. Brunne. I never put on a cushion. I used to winter with the cushion on, but I never could find out why I did so. I try to keep my cellar right; never allowing it to go below 45. I set my hives about a foot and a half from ground; I have never know of brooding in the cellar. I fed one hive last winter and it gave me more honey this summer than any hive I have ever had.

APIARIAN APPLIANCES.

The first order of business was the discussion on apiarian appliances, the first exhibit being of a smoker brought by one of the members. Mr. Miller was called on by the President to give his opinion on the different kinds of smokers in use, and his ideas as to the size of smoker required.

Mr. MILLER, in reply, said that he recommended the use of a larger smoker than the one exhibited, and thought that one with an area of ten and a half inches should suffice. The one he used was a large one, and he had to use it between his knees. He strongly advised the bee-keeper with anything from 100 colonies up to use a large smoker in preference to a small one.

Mr. McEVOY, said that he too preferred one of a good size, stating that the little smokers were a nuisance. He also said that he had not worn a veil for thirty years, and had been trying to train his son to throw it aside too. With the aid of a smoker, he could go through a yard and smoke 40 to 50 hives in 30 minutes and advised every bee-keeper to use a good sized smoker.

Mr. HERSHISHER (Buffalo), in reply to Mr. McEvoy's remark as to making his son discard a veil, asked if there was a Society for the prevention of cruelty to children? (Laughter.)

Mr. HOLTERMANN said he had not brought the smoker to the meeting for the purpose of showing its size or the material of which it was made, but to explain the principle on which the top was put upon the barrel. In private conversation it had been suggested that it would not work, but would clog; he had used that smoker the whole of the present season, and had found it worked most effectively; should soot form, all one had to do was to take a lead pencil and remove it. He considered that there was an art in the use of smoke and the smoker. He had been induced by Mr. Jones not to wear a veil, and had suffered considerably the first year, and he had to persevere persistently, in spite of many stings, before he could get accustomed to do without one, but on the whole he considered that it depended entirely upon the way in which one breathed. The bees do not like much steam about, and it is objectionable to have bees buzzing about one's face, but where it is necessary to disturb the bees it is perhaps advisable not to smoke so heavily.

Mr. BYER said that during a trip he had taken two or three years previously with Mr. McEvoy, he himself had worn a veil whilst Mr. McEvoy had made use of a smoker alone, and he considered that Mr. McEvoy required a very large smoker, for where he had been stung once or twice, Mr. McEvoy had had two or three dozen.

Mr. HOLTERMANN asked if it would not be better to smoke too much than not enough.

Mr. BYER said that a good bee-keeper ought to know how much to use his smoker, and described the use of a smoker, its advantages and disadvantages, taking off the cap and showing how the bellows and cap should work, and stating that a large smoker has the advantage of not requiring to be replenished as often as a small one.

Mr. NEWTON said that he believed every good bee-keeper could tell when the bees had had enough smoke by the sound. He said that he strongly advocated the use of the veil, not on account of the stings, but he believed that more work could be got through with the veil than without, and that that work could be more perfectly done.

Mr. Hershiser said he did not believe in being foolhardy in working with bees, but that he very seldom wore a veil.

The President remarked that some people could be stung and not feel it.

Mr. Newton declared that he did not like the sensation of bees crawling all over him, nor did he like being stung or hurt, and he advocated the use of the veil. He did not wish to get stung simply for the pleasure of saying he did not wear a veil. He did not believe in using so much smoke, either. He considered there was too much smoke used all round, and that occasionally the flavor of smoke entered into the honey and made it unfit for the market. He said that bee-keepers should use as little smoke as possible, and by using a veil this could be obviated. He thought it was best to use means that would produce the largest amount of results. Should a smoker be used, a large smoker was preferable to a small one, as it did not require filling so often.

Mr. Hershiser said he considered the Bingham smoker far ahead of any other, as it had a good draft and kept fire a long time.

Mr. Miller, describing the working and different parts of his smoker, recommended it on account of the improvements it had.

Mr. McEvoy said that in extracting seasons he used as little smoke as possible, and followed Mr. Dickinson's plan of lifting a whole row of supers at a time and shaking the bees out. He considered the Paterson smoker as good as those of American make; it is a large smoker too. The smokers he usually found on his rounds were not of much account.

Mr. Hershiser remarked that all Canadian articles were of superior make.

Mr. Lowey said he liked the smoker which was being exhibited there if the bellows were turned around, but he would throw the nozzle away. He also advocated the use of little smoke, stating that he used a smoker and a veil when working in his yard.

Mr. Byer asked Mr. Lowey his opinion as to the use of the bellows.

Mr. Lowey stated that he could not use bellows with his feet, but could always use them with his hands, but it was a matter of getting used to it.

Mr. Bailey (Bracebridge) thinks there is a good deal in the management of smokers as there is in the management of bees. He advocated the use of a large smoker, as with plenty of fuel it lasts a long time and produces less smoke. If grass is put in the nozzle, and a little in the bottom of the smoker, it will give better smoke and better fire and not so much work. He was in favor of lighting the smoker at the top instead of at the bottom, as it works much better that way.

Mr. Timbers stated that he had tried the plan of using grass—and green grass, too—and it kept the fire down, and therefore kept it cooler, and prevented so much moisture around the top of the smoker, which shortens the life of the smoker by half.

Mr. W. Brunne gave it as his opinion that too much smoke affected the honey, and that in the time of the honey flow no smoke at all should be used. He thought that it all depended on the handling of the bees, and he could not complain of being stung.

Mr. Holtermann asked him how many colonies he ran.

Mr. Brunne replied 110 was the number he had, and again emphasized the fact that he used as little smoke as possible.

BEE-KEEPING AS AN OCCUPATION FOR WOMEN.

By Miss M. Treverrow, Meadowvale.

As a rule, to the woman who has had no practical experience with bees, if she thinks of the subject at all, bee-keeping stands for honey, large profits, studies in natural history, and stings, the latter probably being considered the surest and most objectionable adjunct of the business. But a few years' acquaintance with the little pets will teach her that stings are but insignificant incidents in the bee-keeper's life, that honey is not always sure, nor profits always large, but the study of the nature and habits of the bee can be depended upon at all seasons of the year to yield a fund of interest to any woman who engages in this occupation.

The story of my experience with bees is probably my best means of showing what bee-keeping may be as an occupation for women.

I started bee-keeping in 1900 with one colony, for which I had paid $5. They did not swarm nor give any surplus honey during the summer, were weak in the following spring, and gradually dwindled away till the hive was empty. I purchased another colony for $6 in May of 1901. When they swarmed I divided the bees and brood in the old brood chamber, putting half into a new hive and alternating each with frames of foundation. From the next swarm I received 30 lbs. of surplus honey. For the spring of 1902 I had three colonies, which had given me so little trouble that I thought I could manage a couple more. I purchased two more strong colonies for $15. When they started to cast out first, second, third, and fourth swarms, I began to have some idea of what bee-keeping meant, having double brood chamber in 8-frame Langstroth hives. The swarms were large, and when two swarms issued at the same time I had enough to do to lift the double hives away and replace with new ones before the bees began to return, the queens being clipped. I had heard of twenty swarms issuing at the same time in large yards, but two at a time were enough for me just then.

Those five colonies gave me 928 lbs. of extracted honey and increased to sixteen. At the end of the next season I had thirty-five colonies, and 1,400 lbs. of honey from them. I had thirty colonies in the spring of 1904 and 1905, five having died in the cellar. They yielded about 2,600 lbs. In the spring of 1905, I had thirty-three colonies when the weak ones were united with the strong ones; they stored 4,700 lbs. of honey and increased to forty-nine. Last spring (1906) the numbers decreased to forty, five being queenless and four too weak to go alone. They yielded 1,600 lbs. of honey this year, and I have thirty-nine colonies this fall.

As to stings, my first serious experience with them nearly put me out of business. It was when I had only five colonies. They seemed to be trying to make a record of 200 lbs. per colony for that season, and when I attempted to take the honey off, they resented my interference with their plans with such vigor, that I left the hive open and ran to the house saying to the folks when I got there, "There is no use talking about getting used to stings; I will never be able to stand such punishment as this; it is too much for me." But I did not like to be beaten by the little bees, so I fortified myself against having another attack by covering my hands and wrists with long, heavy gloves and succeeded in taking the honey off. Ever since that time I have worn gloves in handling my bees. Even when clipping queens I use gloves with finger tips cut off. I know that the wearing of gloves is not looked upon with favor by the professional bee-keepers, but when it comes to a question of gloves or defeat, wear gloves.

There are other things connected with the occupation, that are not very agreeable. The stickiness of the honey in uncapping, extracting, weighing, and pouring into cans, which has won for the male bee-keeper the title of "Lick Thumbs," is one of its mildest miseries, so easily reduced to insignificance by the use of water, as to be scarcely worth mentioning; only, we are treating bee-keeping as an occupation for women, and she who takes it up is sure to find that this feature certainly belongs to it.

She may expect, too, considerable hard work and heavy lifting, for in handling 8-frame Langstroth, one of the smallest hives, there are many 60 lbs. lifts, and if she be incapable of lifting that amount, a woman is likely to be handicapped by her inability to move or carry a full hive or super, or a 60. lb. tin of honey. It is well enough to depend on outside help for big days when carrying in supers of honey for extracting, or in weighing it and crating for shipment or conveying the bees to their winter quarters, but for the common everyday work of the apiary which requires much muscluar exertion, the woman who aims to be an efficient bee-keeper cannot afford to depend too much upon outside help.

Bee-keeping may be looked upon as a healthy occupation for women in comparison with many of the avocations to which she is called wherein exercise, fresh air and sunshine are denied her. It is true, there will be times when the humidity of the air and the intense heat of the sun, aggravated by the exercise she is forced to take, through excessive activity of the bees consequent upon these weather conditions, may lead her to exclaim, "Why was I ever born to be melted like this?" But these conditions only last for a few hours in a day, and not very frequently through the season, and there are so many rare, beautiful days to enjoy during the honey harvest, that one forgets the discomforts of a few hot, damp, wilty hours, in the pleasure of those when air and sun and bees combine to make the bee-keeper's life worth living.

One very important part of the business is the melting of old combs. It is hard, sticky work to cut wired combs out of the frames and put them into the extractor. It is difficult for a woman to lift the lid handle, screw and press off the extractor, without getting upon a chair even though she be strong and tall, and this has to be done every time the extractor is filled with combs. The heat, steam, and the odor of hot wax, pollen, etc., make this one of the most objectionable features of bee-keeping; but as house-cleaning, with its dust, disorder, and discomfort, while in progress, proves such a delight to the housekeeper in its results, so comb-melting amply repays the bee-keeper by the improved sanitary condition of the hives; and from what we learn from conversations with experienced bee-keepers in bee journals and deductions from papers read at conventions on the subject of healthy disease-proof colonies, the renewal of clean new foundations in the hive forms a very important factor in insuring healthy conditions in the apiary.

And the possibility is that if woman with her natural house-cleaning proclivities should invade the realm of bee-keeping, this branch of the business would be well attended to, and the problem of foul brood solved without any other formula.

There are many things in connection with bee-keeping that a woman can work at with genuine pleasure. Take that of opening up a few crates of bee supplies, and transforming the neatly made and precisely fitting pieces into hive bodies, bottom boards and cover frames with top, bottom and sides of white, clean wood that fit each other just like a charm and fit the hives just as perfectly. Then there are the folding of sections, the wiring of frames, and imbedding wire in foundation, etc., all neat, clean, fascinating features of the business.

My advice to the woman who wishes to take up this work would be to spend a season with an experienced bee-keeper, if she has the opportunity, paying strict attention to every detail of the work. She would gain thereby much knowledge that, if won by her own experience, would cost her dear. An instance in point of this; I had been told to put an empty super under a large swarm to give them room to cluster and prevent them from swarming out again. I only grasped the one idea, put the super under, and I did not note that it should be taken away at a given time. The consequence was that a colony did not make as much honey in the supers, and in the fall when I strove to take out what I supposed was an empty hive body, I found a peck or perhaps a half bushel of trouble accumulated there in the shrape of combs built towards all the points of the compass, young brood in all stages, hundreds of bees crushed between combs that had fallen when the hive was lifted off, and a possibility that the queen was killed in the general mix-up. To have seen this done properly would have saved me time and expense.

In conclusion, this record shows that a woman may expect the little busy bee to gather honey for her at an average yearly rate of 61 lbs. to the colony; that stings may be subject to her will; stickiness also; that hard work, heavy lifting, perspiration, and disagreeable odors must be borne with fortitude; that careful attention to detail is imperative; and that there are many things in bee-keeping that are calculated to make it attractive and enjoyable, and also a profitable occupation for women.

The PRESIDENT in opening the discussion on the above paper said that he considered the reading of a paper by a lady a most pleasing feature of the meeting, and that, though several of the ladies present had been reluctant to speak or give their opinions on bee-keeping, he hoped that now that they had heard the paper read they would reconsider their decision and give their criticism on it.

The ladies however did not seem anxious to open a discussion.

The PRESIDENT: I do not think there will be any objection to the gentlemen criticising the paper. I think it is an excellent paper, and probably there may be a few things brought out there which would point to a better way of keeping bees.

Mr. HERSHISER: There are two kinds of criticism, one sort that points out deficiencies and one that points out merits, and it is this latter that I would call attention to. There are too many women who think they are not suited to take part in a convention like this. I am glad that this paper has been presented here. It shows what may be accomplished. There are a great many who have the ability and do not think they have. We had a lady bee-keeper in Buffalo, and she had about 100 colonies, and as her family was rather unfortunate she kept working these bees and made a living for herself and her husband, and finally when the husband went blind, this woman kept on working with the bees. Before he went blind he did the heavy work and she was the bee-keeper. After a time she grew old and died, and the bees gradually went down until there was nothing left of them. That showed that she was the bee-keeper. We have many lady bee-keepers throughout the country. Dr. Miller's sister, Mrs. Wilson, is quite a clever bee-keeper. She understands them quite as thoroughly as Dr. Miller himself, and we come across others occasionally. I am very glad to see that ladies are taking this up as an occupation. Of course, the lifting part of it is an objection to their working with it, but if they will look round they will find help and let an experienced person do the work.

Mr. Dickinson: I highly recommend the lady to employ some help in the lifting. I think ladies can show excellent management in the way of keeping bees, but the problem of lifting hives is a difficult one; it would be well to have that overcome by employing some help. They would find it money well invested to pay a good price to get this help. I have tried as much as possible to keep away from hard work personally. When I hear such a paper read, I consider the lady that could write such a paper quite capable of managing a yard.

Mr. Byer: I think that is one of the best papers I have ever heard read. I think we shall have more ladies on the programme next year. There is nothing in that paper to be criticised. As regards this matter of lifting, I do that myself. I have one of the best helpers, but not to do the heavy work. Ladies can get someone for the heavy work just as I got someone for the lighter work.

Mr. Deadman: Speaking about heavy lifting, I think this can be avoided by using a proper hive. Also, if you use a wagon instead of a wheelbarrow you will save yourself a lot. By forethought the lifting can be easily avoided.

Mr. Craig: I am very glad indeed that the Executive put this paper on the programme. I think that apart from everything else, we have, as an Association, overlooked the ladies' part in the work. We know the excellent help afforded us in our work by Mrs. Smith and Mrs. Armstrong, and I consider they are well worth having a place in our programme.

Mr. Timbers: This point of bee-keeping for women is in my opinion an important one. I always make a point of reading the papers to my wife, and she says what I read will do in theory but not in practice. I shall certainly read this report to her. I think when she sees what this lady has accomplished in bee-keeping, she will consent to become a bee-keeper herself.

Mr. Hershiser: As to heavy lifting, I like it. When I go round and have to lift the hives to find out how much they weigh, if there is enough for winter I feel highly exhilarated over the situation. (Laughter.)

Mr. Roach: I think the ladies do the principal part in bee-keeping. I think we should stimulate the idea of ladies going in for bee-keeping. The ones who help me often draw my attention to mistakes in the yard. If they cannot do the heavy work they can do the light work, and it is very important that we should have their help. I have had two, and find in both cases that they gave me most efficient help. I should have missed colonies but for their observation.

Mr. Holmes: I think, from the evident interest that has been taken in this subject, that it is certainly a very pleasing matter that this paper has been presented. It will be very beneficial and far-reaching in its results, as it will come out in the public press, and will be published in our annual report, and will create an ambition in the minds of the ladies in this land if not only to manage bees but to perhaps manage the bee-keepers a little better. (Laughter.) This is a most excellent paper, and has indeed been a pleasure to me.

Mr. Taylor: It is one of the most interesting papers I have heard for a long time. It seems to me that bee-keeping is practically in its infancy. We have a field open for ladies in the light work, which opens up a greater area for bee-keeping than ever. This paper is most interesting to all present and I am very much pleased to hear such a chorus of approval. The young lady is well worthy of filling the position she undertook. She deserves a great deal of congratulation in having broken the ice.

Mr. Couse: I am not at all disappointed in the paper. It was my pleasing duty to write Miss Treverrow inviting her to write a paper.

wrote her that the Committee would like her to do so, she replied that she did not consider herself capable of writing one. I told her the responsibility would be mine, and the Committee's, that we would take all the blame. Now, the Committe is ready to take just a little of credit, for I think no one is disappointed.

RETAILING HONEY.

Mr. JOHN TIMBERS took charge of the Question Box on the above topic.

Q.—How would sugar barrels do for candied buckwheat honey?

A.—I would say in this instance, "Silence is golden," but I will try to answer to the best of my ability. If it would hold the buckwheat honey till it is candied, I think it all right.

Q.—How can I get 10c. per lb. every year for my extracted honey?

A.—Put nothing on the market but first-class quality, and in good shape, and get your customers to depend on you from year to year.

Q.—Is it advisable to sell buckwheat honey to customers, who have been used to clover honey, even if difference in quality is explained to them?

A.—I would never offer buckwheat honey to a customer unless he asks for it. Some prefer buckwheat honey for their own table, while others prefer the white honey. I am retailing buckwheat honey at 9c. and the other at 11c.

Mr. HERSHISER: I would like to ask Mr. Timbers if he considers buckwheat honey as good as white honey.

A.—It is a matter of taste entirely.

Mr. HERSHISER: If your customer comes to you and says he prefers buckwheat honey, why not sell it to him at the same price as the white honey? The bee-keeper has insisted upon it that buckwheat honey is not quite so good and therefore is obliged to sell it at a good deal less; now to some persons it is a good deal better than the white, and why not sell it at a higher price?

Mr. BYERS: I have this year a shortage in the clover honey crop. My customers would, I think, take buckwheat honey; two or three of them do already. I have, however, refused several that wanted 50 lbs. of buckwheat honey, as I know it would knock out the market for clover honey, and I do not know whether it is advisable to sell buckwheat honey, as it pulls down the market.

Mr. ROACH: Buckwheat honey is a great deal in use. I did not want buckwheat honey round my place at all; but the last two years we have had a large stock of it, and I began to use it, and now I like it much better than I thought I should. Customers will come and ask for basswood or clover honey, and when I say I have only buckwheat they take it, and then they get to like it and come back for more. I am sure if buckwheat honey was used more frequently it would be liked as well as clover honey.

Mr. HOLTERMANN: This year I have handled 30,000 lbs. of buckwheat honey, and last year I handled more. It is very important that buckwheat honey should be well ripened; the difference in flavor between green and well ripened buckwheat is more marked than between green and well ripened clover honey. You can go to many places where buckwheat honey is produced, and it is preferred there to white honey. I am not saying it is superior, it stands on its own merits. It is accepted and liked in a great many places, and the more it is used the more it is liked; and for that reason I see no objection to offering buckwheat honey to a person who may ask for white if you have not got it. It may not be advisable to load them up with it, but I would advise them to buy a small quantity to test it.

Mr. TIMBERS: With regard to what Mr. Hershiser said about charging the same price for buckwheat as for the other, I would not like to give the same price for buckwheat honey, and would not have cheek enough to charge it.

Mr. HERSHISER: Just because it has become customary to sell it for less, and of course we have to do as the others do.

Mr. PETTIT: In this matter of buckwheat honey, I find that if the honey is well granulated it is much more palatable. When well ripened it is superior, and can be used as table honey. I like the buckwheat honey as well as the white.

Mr. LAING: I think Mr. Hershiser has made a good point in speaking of the price of buckwheat honey. I think it would be a very good idea to raise the price. Personally, I am fond of clover honey, and I do not know that I am particularly fond of buckwheat honey; but suppose I was just as fond of it as I am of clover, why not pay the same price as for the clover honey?

Mr. HOLTERMANN: It is a question of market values.

Mr. LAING: Of course it is. I think it would be a good idea to raise the price if we can. It is worth every cent as much as clover honey to those who like it.

Mr. BEAUPRE: I think buckwheat honey is sometimes a little off flavor. It is mixed with other flowers, and you do not get the genuine thing.

Mr. LOWEY: I have heard a good deal said against buckwheat honey since I came here. I am a buckwheat man, and I always use it. It is a rich, fine honey, and I know many people who prefer it, and ask me to exchange and give them part buckwheat at the same price. I can see no reason why buckwheat should not be worth as much as clover.

Mr. CHRYSLER: I think it best to sell honey according to the demand and supply. I think there should be a difference in the price between the buckwheat and the white just as there is in the price of grain, and the price must be regulated in the same way—by the supply and demand. If you were to charge the same price for the buckwheat as you do for the clover you would find you had very much left on your hands unsold.

Mr. TRINDER: Talking about buckwheat, you say it is not worth as much as the white. I live in a buckwheat district, and always find that customers will take buckwheat honey in preference to white and say it is the best honey they ever bought. I sell it at 8c. a pound in the stores, and that is all you could get for the white honey. One man will tell me the buckwheat just suits his taste, while he finds no flavor at all in the white.

Mr. BROWN: It is simply the supply and demand that regulate the buckwheat market; it is just as good as the white honey to those who like it. It is according to the taste of the consumer. My experience is that some customers like buckwheat; but most are in favor of the white.

Mr. CRAIG: Many think that buckwheat honey cannot be spoilt. Well, it certainly can, and it is one of the honeys that will not stand liquefying. If you can supply fresh liquid honey it is all right, but if you attempt to liquefy the granulated honey it is not the same honey.

Mr. KIRBY: I have a good demand for buckwheat honey. I put a notice in the local papers that I have it ready, together with the price, and it sells well. A great many rich people have a liking for buckwheat honey, and I soon get rid of quite a quantity in a few weeks.

Mr. HERSHISER: I would like to take up two points. One is in reference to the liquefying of buckwheat honey. If you take time you can bring it out just as good as the white honey. The second point is with reference

to its value as compared with white honey. The National Biscuit Co. used to buy honey from California in large quantities. Such honey is as good in quality as any honey, and they buy honey from Wisconsin, basswood honey, for using in the baking of their goods. Now, I can sell them buckwheat honey at just exactly the same price.

Mr. TIMBERS: We must finally decide it is either a question of management or one of locality. I think it is locality.

Q.—Would you advise charging more than wholesale prices in rural districts?

A.—Certainly; I charge retail price, and I sell to all alike. I have only sold 700 lbs. wholesale since I kept bees. In 1903 I had a big crop and I sold as much as I could and the rest I held over until the next season.

The PRESIDENT: That is a good point—holding it over.

Mr. HOLTERMANN: I do not understand Mr. Timbers saying every man should retail his honey. I wholesale what I can. Would it be better for more people to retail?

Mr. TIMBERS: I do not mean to say that all should retail their honey. Just get round and see how much you could retail; there would always be that much less for the wholesale market.

Mr. LAING: Do you mean to say that you can sell from the house?

Mr. TIMBERS: Yes, I have done so.

Mr. LAING: This gentleman says that he can sell from the house, and there is not another house within half a mile of yours. Did you go and solicit orders?

Mr. TIMBERS: No; I never went round to anyone.

Mr. DICKINSON: I have done the same thing.

Mr. LAING: At what price?

Mr. DICKINSON: At the market price, that is, the retail price.

Mr. HOLMES: I think a man is very fortunate if people will drive for miles to his house and pay him the market price.

Mr. LOWEY: I have never solicited an order; people come several miles and get from 2 to 3 lbs. up to 100 lbs.

Mr. LAING: I like to do everything I can to encourage retailing. I understand a man near me has been selling his honey at 8c. a lb., and people have been driving miles to get it at a wholesale price. They will not get a pound of honey out of me under 10c.

Mr. HERSHISER: Why don't you buy that honey?

Mr. TIMBERS: If he bought that honey would it be a credit to his trade? Half the honey we get put up by the farmers would not be a recommendation to any man to build up a trade on. It is inferior in quality and in the shape it is put on the market.

Q.—What is the best selling size and shape of section for comb honey?

A.—I do not pretend to answer that question; I never needed a super. Last year there was a discussion on, and I asked my friend Mr. Pettit what kind of super he would recommend. I made thirty during the winter, and I have packed them away ready for next year. That is all I know about comb honey.

Q.—Is it advisable to retail honeydew at the Toronto Exhibition or anywhere else?

A.—No, it is not advisable.

Mr. McEVOY: Is it advisable to sell it at all?

Mr. TIMBERS: No, it is not. It would only damage the reputation of the man that sells it, and the reputation of our Canadian honey at large.

Q.—If you were getting and asking 10c. per lb. for your honey, would you refuse to accept an offer of 11c. or 12c.?

A.—I would run away from that man and hide somewhere. I would consider he was a lunatic. (Laughter.)

Q.—Which is the best way to sell honey—by the barrel, or by the can?

A.—I suppose it is in 60-lb. cans. I never sold it in barrels.

Mr. McEvoy: It is the same price, I suppose.

Mr. Whitside: They usually give the same price in Montreal.

Q.—In selling granulated honey in tins, do you put in 10 lbs. of honey, or do you make it weigh 10 lbs.?

A.—I tell my customers the tin is calculated in the weight. I give good weight, but they all understand that they are getting gross weight. I never try to make them believe it is net weight, but I always give two or three ounces over. They are always to understand it is gross weight.

Mr. Holtermann: That is a point of great importance to our market, and there is a great deal of misunderstanding among those who buy cans or packages as to whether they get gross or net weight. I feel very strong on the subject, because in business it comes up time and again. I believe that the majority of people think they are getting 10 lbs. net. The honey goes to the wholesale trade, and is by them retailed, and in nine cases out of ten no explanation is given. I think it should become law that it should be marked on the package.

Mr. McEvoy: I agree with Mr. Holtermann, they should give 10 lbs. in the tin.

Mr. Timbers: When I first started retailing my honey I wanted to put it in the same pails as those used by the wholesalers, but found that no more of these pails were in use, so I had to use the other pails; but I tell my customers it is gross weight and they are not deceived.

Mr. Pettit: I think the wholesaler should mark them gross weight.

Mr. Holtermann: I think this Association should put on record that it be advisable that where gross weight is sold it should be marked distinctly on the package.

Mr. Brown: I think that gross weight should be marked on the cans. I second that motion of Mr. Holtermann.

Mr. Laing: I would like to ask Mr. Holtermann if it would be better if he made that motion in a different form—that we as an Association recommend that all beekeepers use gross weight instead of net weight.

Mr. Deadman: I would like to see Mr. Holtermann's motion accepted. It is very confusing that some of the pails are gross, and some net, and I have always to explain to my customers that my pails hold more. I think it ought to be compulsory that the pails be labelled gross or net, in small type.

Mr. Dickinson: I recommend the pail be marked 10 lb. net.

Mr. Holtermann: This is the first step this Association has taken in this matter at all, and it is perhaps a comparatively easy step; we can probably at a future time go further. I am in favor of legislation in the matter as in adulteration, but perhaps if we go beyond a certain point we may have difficulties.

Mr. Dickinson: I think it is necessary for us to give value for the money we get, and the only way to do it is to give weight. We must certainly make allowance for our packing. If I am shipping to England, I put down as expenses my tins and my crate, but I put in every time the full weight. If that was made compulsory, I think it would be better for the

Association and for the beekeepers of Ontario, and give us the name we deserve.

Mr. HERSHISER: I think in selling honey gross you have to take less for your honey, in selling in large bulk you must sell net weight. You cannot say one barrel will weigh 40 and another 60; there would be no way of getting at the value of the tins. We do not pay the price of butter to the tub when we buy a lb. of butter.

Mr. TIMBERS: Is this Association going to compel its members or recommend them to sell their honey at net weight, when all other things that honey has to compete against are put up in gross weight? All marmalades, jams, preserves, etc., are sold throughout the country gross. Is honey to be the only one sold net?

Mr. DICKINSON: I do not think they sell by weight in jams.

Mr. TIMBERS: Decidedly, anywhere in Toronto.

Mr. LAING: Referring to Mr. Dickinson's remark about people getting value for their money, we buy a pail and pay perhaps 7c., or 8c., 10c. if you like, anywhere along there, and we sell that pail when we weigh it in at identically the same figures we pay for it. Haven't we given the people value for their money?

Mr. PETTIT: Certainly.

Mr. KIRBY: I give people a better bargain in giving them gross weight than by giving them net, and I have much pleasure in seconding Mr. Holtermann's motion.

Mr. HOLTERMANN: I think you understand this resolution goes thus far. It does not compel you to sell gross or net weight; it leaves that open to every individual. But when you sell gross weight; that package must be marked "Gross," and when you sell net it must be marked "Net" in plain figures.

The resolution, as passed, read: "That this Association place itself on record that it is desirable where honey is sold either wholesale or retail, and gross weight is given, that the gross weight shall be distinctly and plainly marked upon the package."

Q.—Would it be advisable to build a covered delivery wagon for retailing honey with name and other information printed on the outside?

A.—I do not hardly think it would be advisable. You would need to have just the right man for that rig to make it pay, and we beekeepers are most of us in the business for what money we can make out of it, and I do not think that would be a paying investment.

Q.—When the consumer pays 10c. per lb. for honey, how much should the retailer pay out and how much the wholesaler?

A.—That would all depend on how many hands it would have to go through. All I ever knew wanted 20 per cent., and some of them wanted 30 per cent. If the big man is going to buy it in bulk and he gets 20 per cent, or 30 per cent., the store-keeper also gets 20 per cent. or 30 per cent. How much is the producer to get out of it? I think the wholesale man should be allowed 20 per cent., and then he and the middleman must make the bargains as they like.

Mr. HERSHISER: The best way is for the producer to sell as high as he can, and let the rest do the best they can.

SPRING MANAGEMENT.

By James Storer, Lindsay.

In the absence of the author, through illness, Mr. Byer read the following paper:

Spring management is a very important part of beekeeping and depends so much on fall management that you will not object, I hope, to a few remarks on that subject. Every hive should have a good queen, and not less than 40 lbs. of good honey. When put in winter quarters, and if properly protected during the long winter, spring feeding will not be necessary. Feeding in spring is a disagreeable job for the beekeeper, and you cannot fuss around a hive at any time of the year without annoying the bees, but more especially at this season.

Suppose a beekeeper has about 100 colonies, part of which have been wintered on their summer stands, and the balance in a good cellar. If proper protection and ventilation have been provided for the hives left outoutdoors, there is no need to touch them till we are getting nice days in April. About that time those wintered in the cellar may be taken out, but a great deal depends on the season, some seasons being much later than others. A good time for removal from the cellar, if the bees can be kept quiet, is when the first pollen is coming in; then choose a fine day. The writer has not tried the Alexander plan, and finds no difficulty with bees mixing. Of course, one must be careful not to put too many hives in one place at the start. Put a few in one corner of the yard, then the opposite corner, and so on until all are placed. Then take four or five sheets of newspaper, previously saved for this purpose, and cover the tops of the hives, taking care that no heat can escape. When the bees are done flying for the day, close all the entrances as close as possible, this to keep the cold wind and robbers out. If the hives on the summer stands have not had papers put under the cushions it should be done now.

In the average season this work should be finished from the 12th of April to about the 20th. Then we may expect the first fruit bloom about the same dates in May, and, knowing the bees have plenty of stores, it is a good plan to leave them alone, except to look out for robbing on a day when the weather is suitable for the job. About the time the first flowers come out, a start should be made to examine the hives, clip the queens, spread or reverse the brood frames, and break a portion of the cappings on the honey, making the bees think they are in clover. When this is being done, the beekeeper should have a book, and note the condition of every hive, as a record of this kind saves lots of unnecessary opening of hives. When we get to No. 100 we will probably find 80 per cent. will be ready for the honey season, 15 per cent. a little light, and some dead queens. The dead ones have been found before the examination, or should have been. The 80 should be watched closely, making sure that there is always enough of unsealed honey in the hive, and that the queen has lots of room for breeding. A good plan to treat the 15 that are light is to select say seven or eight of the best of them, according to their strength, take out all the empty frames. Then go to the lighter ones and take out brood frames and bees and fill out the seven or eight, making sure that you leave the queens in their own hives. The few that are left light can be used to shake swarms on, or anything else the beekeepere can do with them to the best advantage.

We will suppose this work is finished on, say May 20th. In less than a month the clover season will be on, and on the care given the bees for the next few weeks largely depends the amount of surplus the beekeeper will get for his work. Some seasons the bees may fill the hives so full of honey in a few days that the queen is crowded out; then another season the bees will be confined in their hives most of the time and run short of stores, and the queen will stop laying to avoid either extreme: so the beekeeper must be on hand every day to know what is going on and apply the remedy.

QUESTION DRAWER.

Mr. R. H. Smith, St. Thomas, answered the questions propounded:

Q.—Is it best to give, say 40 lbs., feed in the fall, or, say 25 lbs., and then feed the balance in the spring?

A.—I should say it would be safer to feed the 40 lbs. in the fall; you might have unfavorable weather in the spring.

Mr. HERSHISER: I would like to ask if it would not be an advantage to give the difference between the 25 and 40 in the spring?

A.—I do not think it would be sufficient to have only 25 lbs. in the hive in the fall of the year. I should advise giving the whole of the store in the fall.

Mr. LAING: What would you consider would be sufficient?

Mr. SMITH: Not less than 35 lbs.

Mr. LAING: Outside or inside?

Mr. SMITH: Either. I do not think bees consume a great deal between the time we feed them in the spring and the time they go into winter quarters.

Mr. DICKINSON: I think more than 30 lbs. is needed for inside wintering. Do you not think there should be a difference between inside and outside?

Mr. SMITH: Yes, if you have a good cellar; but occasionally you come across stocks of bees that consume an exceptional amount of stores. It is surprising. If bees are strong and in good condition and have a good queen, the amount of stores, one season with another, they will consume.

Mr. DEADMAN: I decidedly object to giving them 40 lbs. in the fall.

Mr. HERSHISER: I find bees consume from 7 to 8 lbs. during the four months they are in the cellar. The most I have had consumed by a colony was 11 or 11½ lbs., and the least 4½ to 5 lbs. Of course these estimates are not entirely correct, because no account was taken; but I believe the experiment was sufficiently correct to warrant stating that 20 lbs. is sufficient for winter stores; and if 20 to 25 lbs. were given, it was enough to last them until the apple blossom came. I would ask what kind of food to give and how to prepare it, that is, how to prepare ordinary candied food. You Canadian beekeepers know how to prepare the candy to carry a strong colony through without loss.

Mr. McEVOY: Take a piece of cheese cloth and place it over the frames. Fill two quart jars with warm sugar syrup and stand upside down over the cheesecloth. Put on an empty super, and pack in around snug and warm, and they will take down 20 lbs. in one night. I generally try to get combs of honey from those who have more than they require. If I had to feed early in the spring, and there was a likelihood of more cool weather, I would make the food comparatively thick; otherwise somewhat thinner.

Q.—Give your opinion of the Alexander method of building up colonies, placing the weak ones over the strong.

A.—I am not an advocate of it. I look upon it as being a good deal upon the principle of robbing Peter to pay Paul.

Mr. KIRBY: Last spring I tried the experiment, and found it worked admirably. I had good working colonies as a result, and must say I am well satisfied with the plan.

Mr. ADAMS: What strength were the weak colonies, were they the size of a silver dollar or what size? How strong were they?

Mr. KIRBY: About the size of my hand. The bees from below would go up through and would help to add to the working conditions of the colony, and give the queen every chance to lay; and in that way the bees would build up rapidly, and in about four weeks I took them down and the hives were full of brood.

Mr. MCEVOY: What time did you put the brood up?

Mr. KIRBY: In May I think.

Mr. HERSHISER: Alexander says it is to be done three or four days after they are taken from the celler.

Mr. KIRBY: I had not the time to attend to them when they should have been attended to.

Mr. HERSHISER: I believe the success of this plan depends upon conditions a good deal, and if it were not for the fact that I consider Mr. Alexander a good beekeeper I might be inclined to doubt the wisdom of his plan. I tried it with some colonies last spring, and failed with about half of them; I attributed the failure to the fact that bees built very slowly last spring, and it was not a fair season in which to try an experiment.

Mr. HOLTERMANN: If a strong colony had an inferior queen, the bees would be able to take care of more brood than she could produce, then it would be an advantage, but virtually I don't see any advantage.

Q.—What is the least number of spaces or combs occupied by bees, where you would consider it advisable to unite?

A.—I may say I am not in favor of uniting to any great extent, and it is a thing which I do not practice. Supposing the bees occupy say four spaces, that is a weak stock. By spreading the combs, and allowing more bees to occupy more space, they are able to keep the brood warm, and do more brood-rearing than when so closely interspaced. Often in a natural spacing where they cap two spaces they cannot brood-rear at all; they cannot keep the brood sufficiently warm. But where there are only two or three spaces it is better to space more widely and keep the bees warm.

Mr. HERSHISER: Some of our beekeepers advocate close spacing and say the bees will take more care of the brood and rear more when closely spaced. I believe in close spacing.

Mr. MCEVOY: I agree with Mr. Hershiser.

Mr. HOLTERMANN: I am in favor of wider spacing. It is only very weak stock than can be made to rear more brood by the closer spacing.

DIRECTORS' REPORT.

The following Report was then read by Mr. Miller, London:

Your Directors for the year 1906 beg leave to report as follows:—The year just closing has been a peculiar one in many respects for the beekeepers of the Province. Bees came through the winter in good condition, and have done well through fruit bloom and were generally very strong for clover and

basswood. The result, however, has shown that in only a few favored localities there was about one half a crop secured, while the great majority experienced the sickening disappointment of baffled hope. The sum of $200 was set apart for the affiliated societies. This has been expended in accordance with the by-laws. The sum of $150 was received from the Executive of the Fruit, Flower, and Honey Show. This, together with the rebate of $50, which was the amount of our grant to the Fruit, Flower, and Honey Show, makes a total of $200 received from that Association.

The Executive of the Ontario Beekeepers' Association thought it desirable and best for the Association to make a collective exhibit instead of individual exhibiting as formerly, and to have a demonstrator distributing literature and explaining the uses of honey. Several thousand copies of the booklet "Food Value of Honey" have been distributed in this manner.

The *Canadian Bee Journal* has been given to the members of the Association during the year.

Copies of the law regarding spraying of fruit trees were mailed to members as recommended.

Your Directors appreciate and approve of the suggestions received from the Department of Agriculture to appoint six Foul Brood Inspectors, and to have the Secretary in the Department of Agriculture.

Your Directors recommend certain changes in By-laws to conform with the act respecting Agricultural Societies.

The Treasurer's report, which will be read in your hearing, will, we trust, show our finances in a satisfactory condition. All of which is respectfully submitted.

(Sgd.) F. J. Miller,
Wm. Couse.
M. B. Holmes.

The proposed changes in the By-laws, as suggested by the Board of Directors, were then read, and, on motion of Mr. McEvoy, seconded by Mr. Craig, were adopted.

FINANCIAL STATEMENT.

For the year ending November 8th, 1906.

Receipts.	$	c.	*Expenditure.*	$	c.
Balance from last report	107	08	Grants to fairs, etc	200	00
Members' fees	159	00	Prizes Fruit, Flower and Honey Show	177	00
Legislative grant	500	00	Officers' salaries	75	00
Affiliated Societies	55	00	Directors' fees and expenses	116	30
Legislative grant to Fruit, Flower and Honey Show	150	00	Postage and stationery	38	95
Miscellaneous	12	00	Printing	20	60
			Judges' expenses	9	00
			Periodicals for members	103	35
			Reporting	50	00
			Expenses of committees	63	70
			Caretakers at Fruit, Flower and Honey Show	15	00
			Auditors	4	00
			Balance on hand	110	18
Total	983	08	Total	983	08

Mr. Armstrong moved, seconded by Mr. Laing, that this Report be adopted. Carried.

AFFILIATED SOCIETIES FOR 1906.

Name of Society	*Secretary.*	*Address.*
Glengarry	J. A. Munroe	Munroe's Mills.
Middlesex	E. L. Bainard	Lambeth.
Simcoe	D. Nolan	Newton Robinson.
Oxford	John Newton	Thamesford.
Norfolk	R. B. Emrick	Tyrrell.
Brant	W. J. Craig	Brantford.
Russell	G. G. Sherriff	Clarence.
Halton	Geo. E. Saunders	Hornby.
York	J. L. Byer	Markham.
Victoria	A. H. Noble	Cresswell.
Haldimand	Wm. Atkinson	Cheapside.

REPORTS OF THE TRANSPORTATION AND HONEY EXCHANGE COMMITTEES.

Mr. HOLTERMANN spoke as follows:—I think you are all aware of the work and object of the Transportation Committee. The committee, consisting of Mr. Couse, Mr. Evans, and myself, met the Railway Commission in Toronto and presented our case. We took a very great interest in it, and worked it up thoroughly. When we had got through, a number of those present came up to us and congratulated us on the way we had presented our case. We certainly did the best we could, and later on we received a report from the Railway Commission. We did not get as much as we would have liked to have got, or thought we should have had. Dr. Mills did not agree with the other two Commissioners in their decision, but thought we should have had extracted honey at as low a rate as syrup. However, we did get some concessions. Beeswax has been first class, and nearly all of you ship beeswax. That was changed to 4th class, which makes a very great difference, and 2nd class in car lots. There was another clause put in, that is, honey in pails with wooden crates. These were 2nd and 4th class, also including bees in hives. The car minimum is now to be 12,000 instead of 20,000 as formerly.

These are the concessions we received from the Railway Co.

R. H. SMITH: That concession of beeswax alone is worth a great deal to bee-keepers of this Province. I know from shipping beeswax in the past, it has been first-class, and bees comb third-class.

Mr. DICKINSON: I move the adoption of the report and also a vote of thanks to the Transportation Committee for the manner in which they have brought about this reduction. Carried unanimously.

Mr. EVANS: The railway men are not able to give reasons as to why the present rates prevail.

Mr. SMITH: We ought to get honey properly rated by the Express Companies.

The following report of the Honey Exchange was sent out on Aug. 7th:

The Committee met in Toronto on Aug. 4th to consider the probable prices that may be obtained for honey.

Each member of the Ontario Bee-keepers' Association was mailed a circular asking them to report the amount of honey they had or would probably have at this date. We regret to say that only about half have taken enough interest to reply. If all had replied the Committee would have been

in a better position to make a report. However, the reports received have come from all parts of the Province, and from no points are the reports good. A few are fair but the majority poor, and we estimate the crop this year to be only from 20 to 25 per cent. of last year. A few have reported from 50 to 60 lbs. per colony, the majority from 20 to 25 and a few nothing.

The fruit crop is reported from fair to good, but prices for the same have been good so far.

As to the price of honey the committee consider that honey should command a good price, at least 10c. wholesale for No. 1 Extracted Honey, and darker grades from 7c. to 9c. Where honey is sold direct to the retail grocer we think 11c. should be obtained in small packages suitable for their trade.

Comb honey is almost a failure and choice No. 1 should bring from $2.00 to $2.50 per dozen.

No. 2 should bring $1.50 to $2.00 per doz., and darker grades from $1.25 to $1.50.

The retail should be 12½c. We find that the old honey has all been consumed, and that the markets have not been as bare for many years.

Mr. Craig: What the Committee wants to know is not the exact amount, but what you expect, so as to be able to estimate at some figure at least as to what the results are and to judge accordingly.

Moved by Mr. Laing and seconded by Mr. Deadman that the Report of the Honey Exchange Committee be adopted. Carried.

REPORT OF TORONTO EXHIBITION REPRESENTATIVE.

Mr. Grainger, the representative to Toronto Exhibition, then delivered the following address:

I have had a good deal of pleasure in attending the meetings of the Agricultural Industries Committee of the Toronto Exhibition. So anxious were the Directors to have our views in connection with the new building that they invited me to come and express my views as to what the bee-keepers would like.

I may emphasize what I said last year about the lack of interest on the part of bee-keepers in the Exhibition. We get more advantages out of the Exhibition than we think. It is not only those who go there with a commercial idea in view that derive benefit. The information given to the public year after year is so great that people are getting to know more about honey in Toronto, and when you consider the numerous questions that are answered, there must be more people better informed as to honey and bee-keeping that we are aware of. In order to show you that it is more thought of than you would imagine, I will relate what I overheard: A little boy came along and said to another fellow, "How do you find the Queen?" whereupon the other promptly answered, "Look for the one with the crown on."

We answer many questions, and distribute a lot of information for the benefit of the bee-keepers.

Some changes are made in the prize list every year. I sent out cards to all contributors, and asked them to state what they thought would be good in the way of a change. Only about half were returned to me. These stated what would be good changes to make, and several sections were cut out this year; but I put in something else to take their place and we got our money. The most interesting thing to bee-keepers, that is to those who are going to

show, is the plan of the new buildings. I brought a very rough plan with me. We thought after the fire that the money voted for the Horticultural building might be used in another way. The money will be expended, however, on the new Horticultural building, the site to be where the old Transportation building was; it is the best place on the grounds and will be the finest building there, and we may therefore expect next year to have one of the finest shows. The light will come in in such a way as to show the honey to the best advantage, and it is proposed to put counters of maple, and have it so fixed that everything will be perfectly clean. The floor being of cement and washed and kept clean, the dust and dirt and sticky mess will likely be done away with. The building must be kept perfectly clean and respectable all the time. (Mr. Granger then described the small plan brought with him). I think that with a building like this, and a good show of honey, we ought to do ourselves credit. I do not know that I have anything else to say on the matter unless it be a recommendation that the bee-keepers, those who are interested, will send any suggestions as to anything new and better for a change. We will have a new building and a better equipment, and the Association will be glad to receive suggestions especially if they are on a new line.

Mr. Smith: As an exhibitor at the Exhibition we have found there is not enough interest taken as there might be; probably in many cases it might be very profitable. The interest shown has created a market in Toronto. From the time that I can remember to the present time, every grocer must keep a supply of honey, far more so than in a country town. It might be very much extended, as Mr. Grainger says, if those interested would send us suggestions; we want new ideas to make more attractive exhibits, and the sooner we get out of the old ruts the better.

On motion of Mr. Laing, seconded by Mr. Smith, this report was adopted.

NEXT PLACE OF MEETING.

It was considered when and where the next meeting should be held. Moved by Mr. Lowey, and seconded by Mr. Holtermann, that the next meeting be held in the city of Toronto, the time of meeting to be left to the Executive Committee.

HONEY SHOW COMMITTEE.

It was decided that the appointment of the Honey Show Committee be left in the hands of the Directors when they were elected.

FALL MANAGEMENT.

By Denis, Nolan, Newton Robinson.

Fall management consists in preparing our bees for winter, for spring, for next season, and, in many ways, it is laying the foundation for future success.

The work of the fall season may be lessened to a great extent by the system of managing during the summer season. About the middle of September make an examination of each colony, find out its condition in regard to its strength of bees and quantity of stores, as well as to whether it has a good laying queen and is in a healthy condition.

If sufficient bees to cover five Langstroth frames are found, it will be safe to put such colonies into winter quarters; if less than this amount of bees it will be better to unite with another weak one and have a good colony.

To do this, remove about half of the lightest combs from colonies to be united, and some times afterwards on a cool evening, put two weak ones together by placing the combs of one with adhering bees alternately between the combs of another. Remove the queen if one is inferior to the other, otherwise the bees settle it amongst themselves. Be careful not to get colonies too strong in this way, as they do not, as a rule, winter as well as medium ones.

All colonies going into winter quarters should have a laying queen, and colonies that have been queenless a short time may be given a laying queen by some safe plan of introduction.

If the colony has been queenless since the swarming season, it will be useless to spend time and feed on them, as the bees are too old and will die during the winter.

The most important part of this season's work is to provide each colony with sufficient good stores to carry them through until they gather feed next season. If we could supply them with about 25 lbs. of good clover honey well ripened and capped, there would be little danger of winter losses.

We must have some reliable way of determining the amount of honey each colony contains as found when we are doing this work. Some good bee-keepers weigh their colonies on scales, allowing so much for the hive, combs, etc., but I consider it unreliable, as there may be a difference of 10 lbs. in the make up of different colonies; a difference of material of the hive, amount of brood, pollen, etc., in the combs.

I consider an examination of the combs the best way of weighing stores, and if honey to the amount of five or six Langstroth frames is found it will be sufficient. A colony with less than this amount should be given well-capped combs to make up the shortage, removing empty combs, and crowding the bees out a few combs, as the food supply and quantity of bees will allow putting in a division board or dummies. This keeps the cluster more compact, and in a body during cold snaps in winter.

If colonies are short and combs of honey are not at hand, liquid feed may be given after first contracting the space for storing as in the other case.

As a rule pure sugar syrup is fed, made from the best granulated sugar; it may be given in any kind of feeder if fed early in the season.

A handy feeder one inch smaller than the inside of the super may be made to go into an extracting super. It may be constructed of undressed lumber waxed at the corners and made of different depths to hold just enough for my colonies, with a few small strips or blocks of wood for floats. Place the feeder upon the tops of the frame, and if the weather is cool feed the syrup warm, contract the entrance, and feed during the middle of the day.

The syrup, I think, gives best results when made of a consistency of three parts of sugar to two of water. Sometimes a little honey is added to prevent granulating, but I never practise it. Our syrup is made with steam, and it gives good satisfaction.

A half inch steam pipe is run down into a barrel or honey storing tank. Put 2½ pails of sugar and one of water until the tank is nearly full, then turn on the steam which will warm the water and agitate the sugar. With a little stirring the sugar is soon dissolved, and the syrup can be drawn off at the bottom.

In conclusion, I wish to state that what I have just given you on this question is solely for the preparation of bees for out-door wintering. Not having any experience in wintering otherwise, I cannot say that it would answer for preparation for indoor wintering.

Mr. BEAUPRE: How late in the fall would you unite?

Mr. MCEVOY: Mr. Nolan speaks about feeding the colony in the middle of September; I think he is about a month too late.

The PRESIDENT: I think so, too.

Mr. MCEVOY: I like plenty of bees for outside wintering; he seems to think we can have too many. He says 25 lbs. of stores are sufficient, but I consider that amount too limited, and would rather have more. I think 25 lbs. not enough.

The PRESIDENT: 35 lbs?

Mr. MCEVOY: I would rather. As to the feed, Mr. Nolan says three parts sugar to two of water; I prefer the proportions two to one.

Mr. NOLAN: I said that a good deal of this work could be done earlier in the season. I did not say we should leave our colonies queenless, but I said that if we found in September that they had been queenless a short time we should by some plan of introduction give them a good laying queen.

The PRESIDENT: Do you propose doubling a colony if you found one queenless?

Mr. NOLAN: I think if we found a colony that had lost a queen one could be given them.

Mr. HOLTERMANN: I think Mr. Nolan will require to change his paper a little; a word or two will be sufficient. I noticed the objection Mr. McEvoy raised. The paper gave me the impression that you were to see they were good laying queens. That was too late to know whether they were good laying queens or simply queens.

Mr. NOLAN: I did not mean to say that we were looking for a queenless colony at that time.

Mr. LAING: As to Mr. Nolan's way of feeding, to those who have steam pipes it is all right if they desire to use them. I have used cold water for years. It is a very easy matter to dissolve three pails of sugar in two pails of water.

Mr. PETTIT: Before we leave this matter, I would ask Mr. Nolan how he knows a hive is queenless in September?

Mr. NOLAN: In 19 cases out of 20 you can tell by the appearance of the combs and by the appearance of the bees.

Mr. HERSHISER: My bees breed a good deal longer than the middle of September. I find brood until the middle of October. I presume it is owing to the locality: if there was nothing for them to gather they would not be breeding up to that time. It would be unsafe for me to look over the colonies to see how many stores were left until they have left off breeding. As to the feed, if I find they diminish, I feed them well, and give them a syrup as thick as they can very well take; the food I give them is 5 lbs. sugar to 2 lbs. water: you may find that too much sugar perhaps. I mix it with hot water, too, and all things considered it will perhaps be better to make the proportions five to three instead of five to two. As to the amount of stores, I think a person will need to be pretty accurate, and examine each

comb separately. I weigh the colonies, and know how much a 10 inch frame should weigh; it weighs 25 lbs. By weighing a colony I can tell how much stores it has. Then I go to work and weigh a lot of brood combs that are empty, and I make plenty of allowance for old combs. You will find they run about a pound.

Mr. PETTIT: Is that the regular Langstroth comb?

Mr. HERSHISER: Yes, they will average a pound each. I do not allow anything for bees.

Mr. TIMBERS: Might not a bee-keeper be deceived sometimes? The cells might be half full of pollen; there ought to be some method of ascertaining whether the combs contain more pollen or more honey.

Mr. HOLTERMANN: If a man is going to feed his bees, he should examine them first. You are not likely to find combs so clogged with pollen unless the queen has been absent.

Mr. TIMBERS: I mean in the stores gathered by the bees themselves.

Mr. MCEVOY: It does not matter if there is a good deal of pollen. The bees consume the honey until they strike that pollen; you should feed to cover that pollen, and feed plenty.

Mr. TIMBERS: Will that amount of pollen answer the same purpose durthe winter as the same amount of honey?

Mr. MCEVOY: No, but if you feed plenty of stores it doesn't matter if there is quite a bit of pollen.

Mr. HOLTERMANN: You are afraid of giving the bees too little rather than too much.

Mr. NEWTON: Speaking about lifting and examining the hives to tell what they weigh, I think there would be lots of trouble among our younger bee-keepers if this were adopted. I think the most satisfactory plan is to weigh the hive, and then to allow so much for the hive; I calculate 23 to 25 lbs. for my hives. If mine weigh 52 to 55 lbs. I feel satisfied that colony will go through, that is in the brood rearing season.

The PRESIDENT: That is good advice. When I first started beekeeping, I could not by feeling the hive tell how much it would weigh, but I got to be a pretty good guesser as to how much a hive would weigh, and for two or three years I have hardly used the scales. Sometimes I test to see if I am correct.

Mr. HERSHISER: It depends a good deal on what time of day you weigh; in the evening they are heavy and in the day they are light.

Mr. ROACH: Suppose you do away with this weighing and feed them as much as possible, would you have too much?

Mr. MCEVOY: Yes.

Mr. HOLTERMANN: With reference to feed, I think 2 lbs. of sugar to 1 lb. of boiling water makes the best food. In the matter of weighing, I agree with the President, if you are used to it, but I think if you are not, it is better to use the scales.

Mr. DEADMAN: The strength of the syrup depends on the time of year you feed; if early in the season use more water. I like to feed with warm syrup, especially if the weather is cool.

Mr. WHITSIDE: There seems a difference between feeding and the bees putting it in themselves. In 1899, for instance, at one yard they got a surplus of about 1,200 lbs., and I took this surplus and fed the other young bees with it, and brought them up to the same standard. About the next June I came round to this same yard again, and found it was all right; there was hardly one starving bee in it, but the other yards had about 150 starved

to death. There were about 80 colonies in the yard where they had the surplus; the other yards averaged about 50.

Mr. McEvoy: When did you feed them?

Mr. Whitside: When I had time.

Mr. McEvoy: But about what period?

Mr. Whitside: About the middle of September.

Mr. McEvoy: Then you started brood rearing?

Mr. Whitside: It is one thing for the colony to have plenty themselves and another thing to feed. It makes quite a difference. All that summer they were at starving point; when they got the feed they could eat three meals a day.

Mr. Brown: It is a general thing throughout the whole Association to feed with sugar syrup. Why not feed honey, their natural food? When I find colonies of bees short of stores, I take out the empty comb and replace it with honey. I don't care whether it is warm or cold water, it is not good food for bees.

Mr. Couse: Mr. Brown speaks of feeding back honey. I have had dark honey which I inteded to sell, and I fed the bees back with it instead. It granulated and the bees starved with abundance of honey.

Mr. Brown: Had it been extracted out of the comb?

Mr. Couse: Yes, I am telling you what I did with honey feeding it back: but I find it granulates.

Mr. Grainger: I have practised Mr. Brown's plan, saving the dark honey for the purpose. I have always been successful in putting back those combs: they are sealed and are just the finest food for a colony that is weak.

Mr. Switzer: I have seen no sign of granulation. I have had my bees three or four winters now, and feed them back honey and they have been all right. I wonder at you having this trouble with the granulated honey.

Mr. Couse: How do you weigh your bees?

Mr. Switzer: I form a sort of string balance, and the bees never know they are being weighed. Hardly a bee will come out of the hive.

The President: Mr. Switzer feeds his bees with honey that never granulated and Mr. Couse feeds honey that has been granulated.

Mr. Holtermann: There is a great difference in honey; some is more apt to granulate than others. This report is going out to the country, and I for one think that it is well just to say a word of warning in the direction of feeding back honey. I know apiaries that have been so badly diseased by feeding back honey, when unknown to the one who did it, that I think it is advisable if feeding back is to be done to feed back with sugar syrup; and while I see the objection to throwing lots of honey on the market, it is sentiment rather than a practical thing. I think it is better to feed back with syrup rather than honey.

Mr. Baillie: One question I would like to ask Mr. Nolan. Referring to feeding back, he said "in September." If a person neglected it and left it till a month later, what would be the consequence?

Mr. Nolan: I do not think it would be advisable to feed so late as the middle of October. It would not be a very easy matter to get them to take it then, as the nights would be too cool. I think when you feed the syrup in the last part of September or early in October the bees ripen it, and the combs become white. In regard to feeding combs of honey, I would rather feed good clover honey in combs if I had them, but we get the clover honey in our extracting combs. So far as feeding extracted honey is concerned, the bees did not winter well on it, and we had great losses. I think it is necessary sometimes to feed the syrup warm, but it takes a lot of stirring to make the syrup with cold water. As regards the weight of the

hives, I do not put any particular weight on them; it is about as fair to say what a hive in the general terms should weigh as what a good bee-keeper should weigh. There is a great difference in the size of hives, and it would hardly be safe to say what weight you should put on, it might be too high or too low. We should not give the bees too much feed, though many bee-keepers think they will not winter well without much feed.

Mr. TIMBERS: Can bees ripen syrup or honey if it is too late to cap it over?

Mr. NOLAN: I think they would ripen it later than they would cap it. I think perhaps if syrup is well ripened it is as good as if it were capped.

Mr. GROSJEAN: I had one very light colony. There was not more than three or four lbs. of honey in the hive when I took them into the cellar. It was very full of bees and I did not like to disturb them in the cellar. I could not find any frame that was not covered with bees, so I took them and fed them about 15 lbs. of one-third honey, one-third water and one-third sugar. It was buckwheat honey. I made it warm, and took it down the cellar and fed them. I looked at them a day or so afterwards and they were quiet, then I made up my mind that should do them till the spring. But I found I had to give them more later on, and they were the best hive I ever had. I got 40 to 50 lbs. more honey from them than from any other hive.

Mr. LAING: Mr. Nolan touched on one point; he said that the colony must not be too strong, that a colony in normal condition, one which is generally strong, not too weak, will winter better than a really powerful one. I would like to have your opinion on this.

Mr. NOLAN: That is in reference to colonies united.

Mr. ROACH: Three years ago I had an exceedingly strong colony. I was much disturbed about it: it was wintering outside till about Christmas. I left them alone, and in the spring they were starving. That is an over-strong colony.

Mr. HERSHISER: The question has been raised as to ripening stores. I want to know what is meant by the ripening of stores. I understand that if stores are ripened they will be capped over. If it is not capped, will it not do just as well?

Mr. McEVOY: Not quite.

Mr. BRUNNE: Speaking of feeding, I never lose any more through feeding in the winter. If I winter in the cellar I can feed the bees at any time with success. I use half water and half best granulated sugar. I find that it answers better than honey, and it is also far cheaper, and for that reason I get more money in my pocket. So far as feeding up is concerned, I feed up by the 1st of October. If you have a house cellar, put them in it, but have them lifted a little so that you can get to them more easily. I said half water and half sugar, but I think it is better to have it a little strong, so that better proportions are three parts sugar and two water, and you can feed them in the cellar any time at all.

Mr. EVANS: There are different cellars. Some will not do to put bees in with uncapped honey, and some will. I like to feed the bees as late as they will take it. If I feed them early and again late in the fall it is all turned into bees, and the hives are short again. I use the old Canadian feeder made by Jones, which I think is the best feeder made in the world. You can cover it well up and keep the heat in, and it keeps the bees all right until the spring. I would rather have my bees in the cellar than anywhere else.

Mr. TAYLOR: A neighbor of mine had 25 colonies two years ago, and kept them in his cellar, in one corner of which there is a spring of water. He had

8-inch frame hives, and he left them the whole winter without a cover on; that is, he just pulled back the covers they had on, giving them granulated sugar syrup. In this way they went the whole winter with nothing else, and were the finest bees I ever saw.

INTRODUCING QUEENS.

Mr. McEvoy was asked to answer the questions propounded:

Q.—Should tobacco be used in the introduction of queens?

A.—No, we do not want to use tobacco at all.

Q.—Would you remove the attendant bees from a cage of a queen purchased from a breeder?

A.—I am not particular about that; but I would never introduce with a cage. If you introduce a queen with a cage and allow her to eat out, some bees would get away from her. I have known bees not to accept her for ten days; they would chase around her and have nothing to do with her; they might possibly kill her, but if you watch closely you need not lose any queens.

Q.—Is it advisable to place the cage containing the new queen in the hive prior to taking out the old one?

A.—If I am not too busy I would; if so, I would leave it. If you wish to introduce an imported queen, I will tell you a plan. You take the brood and put it over the hive and get it capped, then take a fine screen and place it over them, and then let the queen loose. None of them will hurt that queen, that is a safe plan.

Mr. Holtermann: I have paid out at least $200 the last few years in buying queens and introducing them, and Mr. McEvoy's method is all right, only it entails a great deal of work. I can introduce queens as safely as any way I know of by means of the cage.

Mr. Timbers: I have introduced queens, and I always like to take the queen out of the cage she came in and the bees too. I believe that nine times out of ten it is the bees that come with the queen that cause the queen to be killed. As to putting the new queen in before the old is removed, I never tried it but once, and it satisfied me that it was not a successful plan; I believe in removing the old queen before you put in the new one.

The President: You must have candy and feed accessible, as if you put a caged queen without feed at all into an ordinary colony she will starve. She must have her own feed supplied.

Mr. Evans: Won't a queen feed herself?

The President: If she has a chance, she will.

Mr. Armstrong: I introduce the new queen and remove the old one at the same operation. As soon as I receive the queen I take her out of the cage she came in and put her in the prepared cage. Then I take a few young bees out of the colony she is to go into, halve the combs, and put in with the queen and place them on the combs and close the hive, and I found that everything went well.

Mr. Newton: I agree with Mr. Timbers that it is the bees that come with the queen that do the mischief. I think it is more the bees' fault than that of the queen. I find it most successful to remove the queen out of the cage in which she came, shake the comb with the brood about ready to hatch, and with the young bees emerging from the cell and some loose honey. Then I take a piece of netting four or five inches square, let the queen

run on the board and cover her with the netting. I never lose a queen by introducing her in that way.

Q.—Would you advise introducing virgins in the supers over excluders for superseding, than to remove excluders?

A.—No.

Q.—What is the best time, spring or fall, to introduce a queen?

A.—Either, but I would rather introduce that queen in autumn. I would not want to waste the fall. If it was necessary, then in the spring. This will have to be regulated according to circumstances.

Q.—How would you introduce a virgin queen?

A.—The same way as with the other, by caging. If it is a virgin queen, she should not be left more than two days caged, she must be allowed to fly out.

Q.—Have southern queens any advantage over northern reared ones?

A.—I do not think it makes any difference so far as that is concerned.

Q.—Will a queen taken from a foul brood colony carry the disease to another hive?

A.—No, never.

Q.—Can a queen be successfully introduced in a super by shutting the bees off from the brood chamber for forty-eight hours and then remove the super?

A.—I do not understand.

Mr. Chrysler: By introducing a queen in a super, that is, a queen just removed from below, if she is introduced up there a day or two, and the queen excluder is removed, would she be accepted?

A.—Of course.

Mr. Chrysler: If you want to keep her over, you shut off the bees from the super and introduce that queen into the super by shutting the bees off from the brood chamber for forty-eight hours; then remove that super and the bees will go on with that queen successfully.

Mr. McEvoy: Would you put a fine screen over the brood chamber?

Mr. Chrysler: Yes.

Q.—If a queen has lately died and there is no visible preparation for another, will the introduced one be accepted?

A.—At once? I suppose so. I believe in visible preparation all the same.

Mr. Evans: Mr. McEvoy, you said you knew several cases where foul brood has been caused by introducing queens. Where did the queens come from? How did they come, and what were they fed on? Prepared food? Foul brood, Mr. McEvoy states, was caused by bees being brought forward in cages, and with prepared food. He states that that caused foul brood. Now he states that in introducing a queen you never get foul brood. Where is the difference between the bee and the queen?

Mr. McEvoy: I suppose the food has diseased honey in it.

Mr. Couse: Why didn't the queen bring it?

Mr. McEvoy: It is not caused by the queen but by the food: it would be the honey in the prepared food.

Mr. Timbers: I do not think any foul brood honey ought to be mixed with the food.

Mr. Whitside: Are we to understand from Mr. Evans that they sent foul brood candy over here?

Mr. Evans: In all the cages in which the queens are shipped there is candy which has in it some honey, and there is always the risk that there

is some contagion in candy made of that honey. I have imported some of Mr. Moore's, and have no reason to say that it has contained foul brood.

Mr. EVANS: I want to explain that Mr. McEvoy said foul brood had been introduced into the candy by the honey in cages of imported queens.

Mr. HERSHISER: This excitement about foul brood being introduced by imported queens, or shipped queens, I think, came up about a year or two ago, if I remember right. Mr. N. E. France, the Bee Inspector of Wisconsin, knew of one instance of foul brood having been introduced in this way, and that is the only specific instance that I know of, and I think it would be unjust to a queen breeder to spread abroad a mistake of this kind. He might have done it unintentionally. If an Inpector knows of this and he will advise of it, I think he will take precautions that it should not occur again. Did you know for a fact that this has been done in this way, Mr. McEvoy?

Mr. MCEVOY: Yes, I know it.

Mr. HERSHISER: It is a kindness to all bee-keepers to advise them of this. Was it the same person that France knew of?

Mr. MCEVOY: I don't know.

Mr. HERSHISER: I think what we want to do is to protect our beekeepers.

Mr. HOLTERMANN: We want to remember that the germ of foul brood has been discovered in the queen by three bacteriologists. Mr. Evans' proposition that we should not suppress the fact that foul brood may be brought into the hive through this infection of queens is perfectly correct. I am strongly in favor of getting good queens, for we should have better blood in the Province. At any rate, Mr. McEvoy's position in saying that he will not mention the name is a correct one. We may know things, and yet when it comes into a court of law, we might come in for very heavy damages.

Mr. MCEVOY: I don't care anything about that.

Mr. HOLTERMANN: I think Mr. Hershiser's suggestion that the Inspector should advise the queen breeder of it is an excellent one.

Mr. EVANS: I think we ought to know distinctly and plainly how we can bring and introduce these queens without any danger.

Mr. COUSE: Supposing the queen breeder thoroughly boiled the candy in such cases, would there be any danger?

Mr. MCEVOY: No.

Mr. COUSE: Why does he not do it?

Mr. HERSHISER: As Mr. Holtermann states that bacteriologists have discovered the germ of foul brood in the queen, I must suppose it is true, as three scientists have found it. But what I want to know is, whether the queen is capable of transmitting this disease to the colony, or whether the queen is perfectly safe if she has the disease.

The PRESIDENT: Prof. Harrison made the statement as Mr. Holtermann gave it, and I asked him some questions about it, and he said that the queen was taken right out of the hive when she was laying eggs, and it was found in the eggs. I said if that queen were taken out of the hive under the McEvoy treatment, and put in a hive where she could not use those eggs and those eggs dry up and the queen having no chance to lay for some days has no developed eggs in her, would she be likely to transmit the disease. He said that might make a difference. I would like to make a test along that line. The new eggs would be stimulated from pure food and not from the diseased honey and germs.

Mr. PETTIT: I would not like to run the risk.

The PRESIDENT: I think disease is very seldom carried from the queen; I would be afraid of the candy and the attendant bees.

Mr. PETTIT: If it is on the eggs, it gets on the combs.

The PRESIDENT: If the queen is caged for three or four days she becomes very small, and if you introduce her into a hive she will not lay for two or three days, and then those eggs will be developed from the pure food.

Mr. ROACH: If you put her in the cage there is no danger.

The PRESIDENT: Mr. McEvoy's treatment has proved successful; I do not think any one questions it. He takes a diseased queen from a diseased colony and he shakes them off the foundation and leaves them there three days, and then he shakes them again, and it is impossible for that queen to transmit the disease.

Mr. McEVOY: The queen does not give it.

Mr. HOLTERMANN: There is a little matter of a good deal of importance I wish to bring to your notice. I am not an advocate of mere formal votes of thanks. I think there is a good deal of time wasted over matters of this kind. But there is a matter upon which I think we shall all be agreed. We understand that under the new act and under that which has been recommended by this Association, Mr. William Couse will not be Secretary any longer. For some time time he has been desirous of not retaining that position. It is his own recommendation that Mr. Hodgetts, or some one else in the Department, will be appointed Secretary; and I think it will be contrary to our wish that he should leave that position without a very hearty vote of thanks on our part. I want to say that I have known Mr. Couse for 25 years or more, and he is the man who in this position, or in any other, will do that which he sincerely thinks is right. We may not always agree with him, but I believe he has served this Association faithfully and well, and to the very best of his ability, and I would move a very hearty vote of thanks to him for the work he has done for this Association in the past. We regret so far as he is personally concerned that he has withdrawn from that position, and at the same time I would say that I hope and believe that in the place in which the new Secretary is that he will be able to do the work for the Association which a private individual could not do, and which will be in the interests of that Association.

Mr. HOLMES: It is with deep regret that we learn of Mr. Couse's intention to sever his connection with us as Secretary of this Association, and it is with great reluctance that we bow to his decision. It is with very great pleasure that I second the motion that the best thanks of this Association be tendered to Mr. Couse for his valuable services.

The PRESIDENT: It is a pleasure to me to put that motion to you. I have, of course, had a good deal of experience under Mr. Couse. I started with him when I was sixteen years old. I think that he loves this Association, and that he is sorry in one sense that he is forced to give up the Secretaryship. I think that for a number of years if it had not been for that love he would have given up that position, but his other duties are so numerous that he has been making a great sacrifice in doing the work. You might still possibly have retained him, only he feels confident that the work can be done better in another way, and he still be serving the interests of this Association. I therefore tender to Mr. Couse the vote of thanks moved by Mr. Holtermann, and seconded by Mr. Holmes. (Applause).

Mr. COUSE: I really appreciate this. It was with reluctance that I accepted the position something over 21 years ago. The responsibility was then literally thrown upon me, and when you put the responsibility on to a person, if he has a certain amount of ambition, he will attempt to bear it. I might say my ambition has been to serve the Association well. I hated to go through with it and make a failure. I have had a certain amount of labor

in the 21 years. I suppose if the total number of hours were taken, it would be found that they were very numerous. That is past now, but I have a great asset at the present time for all these hours, the greatest asset a man can have—life-long friends. I feel that I have not made any enemies. I think if a man can keep his position for 21 years, and have no enemies he is fortunate; it is a position to be appreciated. The vote of thanks you have passed makes me think you have appreciated what I have done. I have had relations with other Presidents in the Association, but up to date, I have never had any real unpleasantness with any of them. They have always aimed to do what they thought best, and I stand here convinced that with almost every President of the Association, they have been most honest in trying to do something for the Association and the Bee-keepers of the Province. That is a pleasing thing to state. Men are very contrary, and the most contrary man is the most honest man. To-day my duties at my business have increased to a great extent and I have not the time to continue those in connection with this Association. I spoke once or twice last winter to the Minister of Agriculture, that I thought it would be wise if the Secretaryship were in the Department, and if the man who took it had a stenographer there would be a good chance of distributing all information possible. Mr. James said that business could be despatched much more quickly in the Department than if they employed some party outside of the building. I said even if I wanted the position, I saw clearly that the work for the Association could be done in the Department much better than outside. I have worked for the interests of the Association as well as I could. I have spent a month this year, not far short of one month out of the twelve, on the work of the Association, but my other duties are so numerous that I cannot continue. I am very glad that I have served for such a length of time, and can quit with the feeling that we have now a great Association. I am very grateful for the vote of thanks.

Mr. HOLTERMANN: There is another important matter I wish to speak about. I was up at the Parliament Buildings in connection with it. Durthe course of next winter there is to be a revision of the Joint Stock Companies Act and this will effect these Companies generally. I went up to the Department and saw Prof. James and suggested to him that bee-keepers should have the same privileges that dairymen have in connection with the formation of Joint Stock Companies for the sale of their products, and Mr. James thought it was a very good idea. I asked him if he would draft a resolution that could be presented before the Association, and I have this now in hand, and he said if we saw fit he would submit it to the Hon. Mr. Hanna, and when he was drafting the act he would draw the attention of the Legislature in this matter.

"To the Hon. Mr. Hanna:

"That the bee-keepers feel the need of provision whereby they can organise companies for handling their products with as little expense as possible, somewhat in the line of the dairymen and fruit men.

"That it is understood that a new Companies' Act will be introduced at the next meeting of the Legislature to cover organizations and other companies.

"That the wants of the bee-keepers be considered in this matter and that a resolution be sent to the Hon. Provincial Secretary, Mr. Hanna."

Mr. CHRYSLER: I think it is one of the best things we could put our attention to. I know what the Chatham Fruit Growers' Association has done

for several years back. It is probably eight years since they began, but they are now a Joint Stock Co. It has not cost one of its members one cent. I do not suppose it is much use giving you all the troubles it has had to go through during the last few years, but they have resulted in this, that each member has contributed a certain amount of stock in the way of fruit, and they have built a big warehouse, packing stand and so on, and they hire men, etc. They have a President and Directors and elect a seller and a packer on a percentage. The seller gets so much to sell our fruit in the Northwest, and he is bound to sell it in the most satisfactory way; the better he sells it the more money he gets; and the packer gets a certain percentage for packing the fruit also, and it is altogether a very satisfactory concern. Two years ago I looked at the books and found them in good condition, the only trouble was we were not incorporated, and were getting on dangerous ground, so last year we incorporated.

Mr. HOLTERMANN and Mr. CHRYSLER moved that the Department pass an act to enable bee-keepers to form incorporated societies for the sale of their products. Carried unanimously.

A resolution was passed thanking the York County Council for the use of the building in which the convention had been held, and also for the pleasing way in which the permission to use it had been granted.

A vote of thanks was also extended to all those who had taken part in the Convention, and to those who had written such excellent papers, and also to the President who had presided in such an able manner.

The PRESIDENT said he need not be included as the attention and patience shown testified to the way in which his efforts had been appreciated.

This resolution, moved by Mr. COUSE and seconded by Mr. LAING, was carried unanimously.

The WARDEN for the County of York said that if it had been a pleasure for the bee-keepers to meet in the room they were able to lend them, it had also been a pleasure for the members of the County Council to let them have that room. They had lost nothing if the bee-keepers had gained something. He hoped, however, that the bee-keepers had not left any stings behind them, that would make things warm for them at their next meeting on Nov. 26th. He hoped they had not brought any samples with them unless it was honey. He also said that if at any future time he might not be in a position to grant them the privilege of the use of the room he hoped the future members of the Council would extend that privilege to them.

DIRECTORS' MEETING.

The new Board of Directors met on November 9th for the election of officers and transaction of business.

On motion of Mr. ARMSTRONG, seconded by Mr. LOWEY, it was decided to give the *Canadian Bee Journal* as a premium to the members.

Mr. BROWN, seconded by Mr. DEADMAN, moved that the Executive be composed of the President, First and Second Vice-Presidents. Carried.

On motion of Mr. BROWN, seconded by Mr. HOLMES, $200 was appropriated for the affliated societies. It was decided to send out the spraying notices this year as usual, but that the offer of $25.00 for the first conviction of an offence under the Act be rescinded and left off the notices.

It was moved by Mr. LOWEY, seconded by Mr. DEADMAN, that Mr. Sibbald be invited to help draw up the revised by-laws. Carried.

Moved by Mr. Deadman, seconded by Mr. Holmes, that the Honey Show Committee consist of the Executive Committee together with the Secretary. Carried.

A number of accounts were passed for payment.

On motion the Executive were empowered to do any further necessary business.

The meeting then adjourned.

EFFECT OF BEES ON PLANTS.

Toronto, November 12th, 1906.

Dear Sir,—You wrote us the other day asking what had been done with the resolution asking the Department to undertake experiments in order to determine the effect of bees on plants. The matter was referred to the Entomological Department at the Agricultural College, and Professor Sherman started an investigation and collected information in regard to experiments carried on in the United States. According to it, he stated that it had been proved that bees were absolutely harmless so far as flowers, plants and fruit were concerned. Professor Sherman resigned his position, and thereby the matter was lost sight of. However, I enclose herewith the opinion of Dr. Bethune, successor to Professor Sherman, who is Professor of Entomology. This covers the ground. I would suggest that you print this letter in the report of the Association for 1906, and thereby give it wide circulation. I will take the matter up with your successor, Mr. F. W. Hodgetts.

This information did not arrive in time for us to lay it before your Association while in session.

Yours very truly,

(Sgd.) C. C. James,
Deputy Minister of Agriculture.

W. Couse, Esq.,
Streetsville, Ont.

Guelph, November 8th, 1906.

President Creelman, *O. A. College.*

Dear Sir,—With reference to the desire of the Bee-Keepers' Association to have experiments conducted regarding the value of the work performed by bees in the fertilization of blossoms, I beg to say that such experiments have been repeatedly carried out during the last fifteen years or more at many of the Agricultural Experiment Stations in the United States, and that our own observations and those of Dr. Fletcher at Ottawa entirely coincide with the results that have been published.

It has been conclusively proved by repated experiments carried on in widely separated localities that—

1. Bees are not in any way detrimental to any of the farmers' crops.

2. On the contrary it has been proved that when bees have been prevented from visiting the blossoms of apples, pears, cherries, strawberries, raspberries, clover and other plants, the yield of fruit was greatly reduced. Other insects, of course, assist in the cross-fertilization of blossoms, but bees perform the larger share of this office in the case of the plants above mentioned.

3. The structure of the mouth parts of the honey-bee is of such a character that the insect is unable to puncture the skin of grapes, peaches or other fruit. This, however, may be done by wasps and some beetles. When fruit has been cracked or punctured by other agencies, bees will take advantage of the opportunity of getting at the sweet juices, but they have not caused the initial injury. In some cases they may be regarded as doing a useful work by removing the juices that would otherwise cause the decay of sound grapes in the same bunch.

4. It is a well established fact that red clover depends upon bumble-bees and white clover on honey-bees for fertilization and production of seed. Without the agency of these insects no seed is matured.

With our knowledge of the good work performed by bees and their inability to injure crops in any way, there does not seem to be any necessity for conducting further experiments in this direction. Farmers and fruit-growers may rest assured that bees, apart from the commercial value of their products should be classed among their best friends.

Yours very faithfully,

(Sgd.) Charles J. Bethune,
Professor of Entomology.

BY-LAWS.

1. This Association shall be known as the Ontario Bee-Keepers' Association, and shall be composed of those interested in bee-keeping who become enrolled as members by paying the annual membership fee of one dollar, or as provided in Clause 19 of the Constitution.

2. A general meeting of the members of this Association shall be held once a year, and shall be known as the Annual Meeting, the year to begin with the election of officers at such Annual Meeting and terminate on the election of their successors at the next Annual Meeting. At this Annual Meeting, or any other general meeting of this Association, ten members in good standing shall constitute a quorum.

3. The place of holding the next Annual Meeting shall be fixed by the members present at the Annual Meeting.

4. The Board of Management shall consist of twelve Directors, elected one from each of the following divisions:

Division No. 1.—Stormont, Dundas, Glengarry, Prescott and Cornwall.
Division No. 2.—Lanark, Renfrew, Carleton, Russell and Ottawa.
Division No. 3.—Frontenac, Kingston, Leeds, Grenville and Brockville.
Division No. 4.—Hastings, Addington, Lennox and Prince Edward.
Division No. 5.—Durham, Northumberland, Peterborough, Victoria and Haliburton.
Division No. 6.—York, Ontario, Peel, Cardwell and Toronto.
Division No. 7.—Wellington, Waterloo, Wentworth, Dufferin, Halton and Hamilton.
Division No. 8.—Lincoln, Niagara, Welland, Haldimand and Monck.
Division No. 9.—Elgin, Brant, Oxford and Norfolk.
Division No. 10—Huron, Bruce, Grey and Perth
Division No. 11.—Essex, Kent, Lambton, Middlesex and London.
Division No. 12.—Algoma, Simcoe, Muskoka, Parry Sound, Nipissing and Manitoulin.

Also one Director from the Ontario Agricultural College and Experimental Farm.

The Board of Management shall from among themselves, elect a President, and two Vice-Presidents.

They shall also appoint from among themselves, or otherwise, a Secretary and a Treasurer, and shall also appoint at least three of their number as an Executive Committee.

5. Five members of the Board shall constitute a quorum.

6. Vacancies on the Board by death, resignation or non-acceptance of position, may be filled by the President, subject to the approval of the Executive Committee.

7. The officers of this Association shall be elected by ballot, with the exception of the Auditor, who may be elected by an open vote of the Association.

8. It shall be the duty of the President to preside at all meetings of this Association; to call for reports; to put motions when seconded; to decide upon questions of order, and to declare the result of ballots and elections. The President, in connection with the Secretary, shall have power to call special meetings when necessary. The President shall be *ex-officio* chairman of the Board of Directors, and shall call it together when necessary.

9. In the event of the death or absence of the President, the Vice-President shall discharge his duties.

10. It shall be the duty of the Secretary to keep and preserve the books of the Association; to call the roll and read the minutes at every meeting of the Association; to conduct all correspondence of the Association; to receive and transfer all moneys received for fees and otherwise to the Treasurer, having taken a receipt for the same; to make out a statistical report for the Association and for the Government; to furnish the officers of the County and District Associations with forms for organization and annual reports and to give notice of Association and Board meetings through the press or otherwise.

11. It shall be the duty of the Treasurer to furnish such securities for the moneys of the Association as the Board may determine; to receive from the Secretary all moneys belonging to the Association, and to give receipts for the same; to pay them out on order endorsed by the President and Secretary, and to render a written report of all receipts and disbursements at each Annual Meeting. He shall give security as provided by Clause 17 of the Act respecting Agricultural Associations.

12. Any County or District Bee-Keepers' Association in the Province of Ontario may become affiliated with this Association on payment of five dollars, which shall be paid to the Secretary on or before the first day of June in each year; but every local Association so affiliated must have on the membership roll at least ten members who are also members of the Ontario Bee-Keepers' Association at the time of its affiliation.

and must continue to have a like number of its members on the roll of this Association while it remains in affiliation.

13. Every affiliated Association shall receive an annual grant out of the funds of this Association. The amount of such grant shall be fixed by the Board from year to year.

14. All grants to affiliated Associations shall be expended in prizes for honey shows, or for shows of apiarian appliances, or for lectures on subjects pertaining to bee culture, or for advertising district or county meetings, or for any or all of these, and for any other purpose not inconsistent with the objects of the Ontario Bee-Keepers' Association.

15. Every affiliated Association shall report to the Secretary of this Association (on a form to be supplied by the Secretary) ten days before the Annual Meeting of the Ontario Bee-Keepers' Association, which report shall be signed by the President and Secretary of the affiliated Associations.

16. County or District Associations seeking affiliation should forward to the Secretary an application according to the following form: "We, whose names are written in the accompanying form, having organized ourselves into a County (or District) Association, to be known as County (or District) Association No. —, desire to become affiliated to the Ontario Bee-Keepers' Association, and we agree to conform to the Constitution and By-laws of said Association.'

Form of application as follows:

Names of those already Members of the O. B. K. A.	P. O. Address	Fees.	Names of those not already Members of the O. B. K. A.	P. O. Address	Fees.	Remarks.

17. Every affiliated Association that neglects or refuses to pay the annual affiliation fee, or neglects or refuses to forward to the Secretary the annual report on or before the date fixed, may be deprived of their affiliation privileges by the Board.

18. Should an affiliated Association become defunct after payment to it of the grant from this Association, any unexpended balance of said grant shall be forfeited and paid over to the Treasurer of this Association.

19. Membership fees of affiliated Associations shall be at least fifty cents. Any such members may become members of the Ontario Bee-Keepers' Association by paying an aditional fifty cents to the Secretary of the affiliated Association, who shall forward said fee to the Secretary of the Ontario Bee-Keepers' Association.

20. Each affiliated Asosciation shall be entitled to the services of an Association lecturer (when such exists) once in each year, half the expenses connected with such lecture to be borne by the District or County Association and half by this Association.

21. The order of business by which the meetings of this Association shall be governed shall be at the discretion of the President, but subject to appeal to the meeting when objection is taken, when a majority vote of the members present shall decide on the objection, and in such cases the vote of the majority shall be final.

22. These By-laws may be amended by a majority vote of the members present at any Annual Meeting, or at a special meeting of the members called for the purpose of considering the same, and of which at least two weeks' notice shall be given by public advertisement.

APPENDIX.

AN ACT FOR THE SUPPRESSION OF FOUL BROOD AMONG BEES.

CHAP. 51, 6 EDWARD VII., 1906.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. This Act may be known as "*The Foul Brood Act.*"

2. The Lieutenant-Governor in Council upon the recommendation of the Minister of Agriculture may from time to time appoint one or more Inspectors of Apiaries to enforce this Act, and the Inspector shall, if so required, produce the certificate of his appointment on entering upon any premises in the discharge of his duties. And the Minister shall instruct and control each Inspector in the carrying out of the provisions of this Act. The remuneration to be paid to any Inspector under this Act shall be determined by order of the Lieutenant-Governor in Council.

3. The Inspector shall, whenever so directed by the Minister of Agriculture, visit without unnecessary delay any locality in the Province of Ontario and there examine any apiary or apiaries to which the said Minister may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and wherever the said Inspector is satisfied of the existance of foul brood in its virulent or malignant type, it shall be the duty of the Inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of the said Inspector; but where the Inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the Inspector has reason to believe that it may be entirely cured, then the Inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists.

4. The Inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the Inspector may destroy, or order the destruction of, such box hives and the bees dwelling therein.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies or infected appliances, shall on conviction thereof, before any Justice of the Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months.

6. Any person whose bees have been destroyed or treated for foul brood who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the Inspector so to do, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his

bees, shall, on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month.

7. Any owner or possessor of bees who refuses to allow the Inspector to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by the Inspector, may, on the complaint of the Inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and every subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the Inspector.

8. Where an owner or possessor of bees disobeys the directions of the said Inspector, or offers resistance to, or obstructs the said Inspector, a Justice of the Peace may, upon the complaint of the said Inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the direction of the Inspector, proceed to the premises of such owner or possessor and assist the Inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said Inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act.

9. Before proceeding against any person before a Justice of the Peace, the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person.

10. Every bee-keeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the Minister of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs.

11. Each Inspector shall report to the Minister as to the inspection of any apiary in such form and manner as the Minister may direct, and all reports shall be filed in the Department of Agriculture, and shall be made public as the Minister may direct or upon order of the Legislative Assembly.

12. Chapter 283 of the Revised Statues of Ontario, 1897, entitled *An Act for the Suppression of Foul Brood among Bees*, is repealed.

ANNUAL REPORTS

OF THE

Dairymen's Associations

OF THE

PROVINCE OF ONTARIO

1906

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1907

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TORONTO.

To the Honourable William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario:

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Dairymen's Association of Eastern Ontario for 1906; and the Report of the Dairymen's Association of Western Ontario for 1906.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1907.

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OFFICERS FOR 1907.

EASTERN DAIRYMEN'S ASSOCIATION.

President.....J. R. Dargavel, M.P.P. ....Elgin.
1st Vice-President.....Henry Glendenning.....Manilla.
2nd Vice-President.....Levi Patton.....Brockville.
Secretary.....R. G. Murphy.....Brockville.
Treasurer.....James R. Anderson.....Mountain View.

Auditors: Morden Bird, Stirling; F. Brenton, Belleville.

Directors:

John H. Singleton, Smith's Falls.
Neil Fraser, Vankleek Hill.
Edward Kidd, North Gower.
J. D. McPhail, Russell.
John McGregor, Alexandria.
Angus Grant, Moose Creek.
C. F. Whittaker, North Williamsburg.
Levi Patton, Brockville.
G. W. Carson, Charleville.
John R. Dargavel, M.P.P., Elgin.
D. Derbyshire, M.P., Brockville.
T. A. Thompson, Almonte.
William Guthrie, Perth Road.
Robert Merzler, Odessa.
James Whitton, Wellman's Corners.
T. B. Carlaw, Warkworth.
G. A. Gillespie, Peterborough.
Henry Glendenning, Manilla.
D. H. Young, Melville.
G. G. Publow, Kingston.

WESTERN DAIRYMEN'S ASSOCIATION.

President.....Jno. McQuaker.....Owen Sound.
1st Vice-President.....Jno. Brodie.....Mapleton.
2nd Vice-President.....J. J. Parsons.....Jarvis.
3rd Vice-President .....Jno. H. Scott.....Exeter.
Secretary-Treasurer.....Frank Herns.....London.

Directors:

Thos. Ballantyne, Jr., Stratford.
J. N. Paget, Canboro.
D. A. Dempsey, Stratford.
W. Waddell, Strathroy.
Geo. A. Boyes, Putnam.
Samuel Wallace, Burgessville.
J. B. Smith, Alton.

FINANCIAL STATEMENTS.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Receipts.		Expenditures.	
Balance on hand from 1905...	$652 55	Convention or regular meetings	$481 30
Members' fees	290 00	Officers' salaries	374 00
Donations	485 00	Directors' expenses	474 75
Legislative grant	2,000 00	Postage and stationery	75 00
Advertising	165 00	Printing and advertising	155 45
		Lecturers' expenses	28 25
		Inspectors' expenses	31 53
		Reporting	35 00
		Rental Opera House, Peterboro	150 00
		Local Committee	49 35
		Music at Convention	37 00
		Stock in Canadian Dairyman	245 00
		Interest, express and caretaker	13 35
		Balance on hand	1,442 57
Total	$3,592 55	Total	$3,592 55

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

Receipts.		Expenditure.	
Cash on hand	$718 07	Prizes	$390 00
Members' fees	352 00	Expenses for convention	167 60
Donations	26 50	Officers' salaries	182 00
Legislative grant	2,000 00	Directors' fees and expenses	221 80
Sale of exhibits	2,597 27	Postage, printing and advertising	246 98
Advertising in programme	160 00	Judges' expenses	52 80
		Lecturers' expenses	15 45
		Auditors	9 65
		Periodical for members	179 00
		Reporting	70 00
		Purchase of exhibits	2,776 60
		Office light and cleaning	24 57
		Office furniture	14 95
		Office rent	119 60
		Stock Dairyman Pub. Co.	100 00
		Telegraph and telephone	65 11
		Express and cold storage	34 61
		Supplies for buttermaking contest	62 69
		Balance on hand	1,120 43
Total	$5,853 84	Total	$5,853 84

Dairymen's Association of Eastern Ontario.

ANNUAL MEETING.

The thirtieth annual meeting of the Dairymen's Association of Eastern Ontario was held in St. Patrick's Hall, in the City of Ottawa, on the 9th, 10th and 11th of January, 1907.

The great feature of this Convention was the enthusiasm of everybody connected with dairying in Eastern Ontario. Prices were good, the business was never better than at the present time, Canadian cheese has been increasing in demand in the British market, the Sanitary Inspectors and Instructors have had the effect of making most of the factories thoroughly clean and up to date, and it can be said of Canadian cheese that it is pure, clean and wholesome.

Mr. J. A. Ruddick, Dominion Dairy Commissioner, occupied the chair at the opening meeting. Among other things he said: I am very glad, as a representative of the Department of Agriculture, to welcome the farmers to the city of Ottawa. I think it is a splendid place to hold a convention, and I know from experience in this locality that you will be able to get a good meeting of farmers to discuss questions in which they are interested. I have been at a good many of these conventions for the last 25 years. I have attended every one when I was in Canada. I will not take up your time, but will call upon the President to deliver his annual address. (Applause.)

PRESIDENT'S ADDRESS.

By D. Derbyshire, M.P., Brockville.

It is a great pleasure to have Mr. Ruddick in the chair, as he has always taken such a deep interest in everything pertaining to the work of dairymen in the past, and has been co-operating and rendering us valuable assistance.

It is also a pleasure to meet in the capital city of the Dominion, and especially so when we see the wonderful development the people of this section have made since we last met here. You have more than doubled your output of butter, cheese, and bacon, which plainly demonstrates to us that you appreciated and put into effect some of the truths brought out at our last meeting here, and we hope that this meeting will be of even more importance to you.

I desire, on behalf of the Directors of the Association, to thank you for the very cordial reception extended to us. We feel under special obligations to your local committee who rendered our secretary, Mr. Murphy, such valuable assistance in making preliminary arrangements for this meeting. We wish to thank your city council, your county council, your banks and business men for their generous aid financially, in bearing some of the expenses incident to the holding of a meeting of this kind.

We are pleased with the enterprise of your citizens, your magnificent buildings, churches and schools, all of which are of the very best, not forgetting our Parliament buildings, which, for location, style of architecture

and beauty, are not excelled on the continent. You have the finest of water powers, fine railway facilities, and everything to make a great commercial city. As you are in the centre of a great agricultural district, there is nothing can impede your progress.

The dairymen of Eastern Ontario are pleased that His Excellency Earl Grey has consented to open this convention, thus identifying himself with the dairymen, and thus causing us to feel that we have his sympathy in the great work we have in hand in educating the people to place larger quantities and better qualities of dairy products upon the English market.

With reference to the output of our dairy industry, we have to acknowledge that we did not produce quite so much milk as in 1905, owing to the shortage of pastures, and we feel confident that with all the educational advantages that are in reach of our dairymen—such as this Association, the dairy schools, agricultural colleges, and cow-testing associations—a greater quantity should have been produced. We believe that the cow-testing Associations which are being encouraged and established under the supervision of our Dairy Commissioner, should receive more attention from the dairymen, and that nothing would have aided more in keeping up the quantity and standard of quality than the accurate knowledge of just what our individual animals are doing, which is easily obtained by the information of these cow-testing associations.

We find that we made about 100,000 more cheese this year than last, yet we find that we are behind in the exports of butter about 180,000 packages. However, with the high prices obtained, we find that the estimated value of cheese, butter, and bacon exported will amount to about $46,500,000 from the make of 1906, and when you add to this $54,500,000—the value of these articles of food (including milk) consumed at home—we have a grand total of $101,000,000, which is $6,000,000 more than for the year 1905, and as our dairymen become better educated in the work, we expect to see the demand for both foreign and home consumption increase each succeeding year.

Under the direction of the Hon. Nelson Monteith, Minister of Agriculture for Ontario, we have had twenty-eight instructors and two sanitary inspectors for the year 1906 just closed, and we expect our staff to be increased for the next year, and each instructor made a sanitary inspector. We have also had the services of our Chief Instructor, G. G. Publow, whose untiring energies and marked ability have always been at the disposal of this Association.

Our Dairy Commissioner for the Dominion has also been of great assistance to the dairy industry in many ways, and his work in the line of better transportation and refrigeration has been much appreciated. He has extended the work a great deal this last year by placing more iced cars for transporting dairy products throughout the Dominion, and for the first time a travelling iced car inspector, the results being that the goods were delivered in Montreal in better condition than heretofore. This improvement in transportation has been brought about by the close attention and oversight of Mr. Ruddick. The Surrey Dock Company, of London, have given such splendid satisfaction in handling our goods for the London market that we are hoping the other ports will provide similar facilities.

The supremacy of our dairy products for 1905 is largely due to the additional work of our instructors, under Chief Instructor Publow, and the influence of our cool curing-rooms and improved transportation on our railways and steamships, thus delivering our goods upon the British market in better condition than ever before, and securing for us better prices and a greater demand.

I am proud of the fact that our dairymen have been very prosperous during the year just closed, and I predict a continuation of this prosperity for the coming year; yet I regret that our manufacturers have not shared in that prosperity as in most instances they are paid the same prices only, as formerly. I do hope our dairymen will carefully consider this matter, which is, in my opinion, of vital importance to them, and not allow their old and trusted makers to retire from this business, but encourage them by giving them at least 1¼c. for manufacturing, and urge them to attend our Eastern Dairy School, which is so well equipped to give them a thorough training, and thus enable them to do much better service in the coming year.

With our present opportunities for education and instruction, and with every factory in Eastern Ontario belonging to the syndicate system, with our milk producers joining heartily with the manufacturer, we hope to make 1907 the most prosperous in our history.

I wish to express my appreciation of the honor that has been conferred upon me by selecting me through a series of years as your President, and for the courtesy and kindness shown me by the officers and members of this Association, as well as by the dairymen throughout all of Eastern Ontario, and as I am retiring from the Presidency of this Association, I trust that the same harmony will prevail, and that you will have but one object in view in the years to come: That of raising our standard as well as the quantity of our dairy products in Eastern Ontario.

I have had the pleasure of seeing this industry rise from small proportions to the mammoth position it occupies to-day, and I want to again thank those who have been associated with me in this work for their untiring energy and hearty co-operation. I can heartily testify to their earnestness and ability, and the rapid advancement that has been made in every department of dairying also testifies to their adaptability for the positions they have held.

As your retiring President I would like to have every producer, every maker, every proprietor of a factory join with me in making one supreme effort for improvement all along the line, and have for our watchword for 1907: "Improvement." (Applause.)

Mr. Ruddick: I am sure you all agree with me in saying the President has touched on some very important matters in his annual address. I was particularly interested in one point which he mentioned in respect to the importance of our home market. I hope before the convention is over to have an opportunity of enlarging on that point to some extent. I think you will also agree with me that it was a somewhat momentous hint he made when he told us he intended to retire from the Presidency of this Association. To attend a dairy convention in Eastern Ontario, and not to find Mr. Derbyshire in the chair, would be very strange to most of us, because he has occupied that position so long and so well, and to the satisfaction of the dairymen of Eastern Ontario. (Applause.)

Another subject that is on our programme this morning is the matter of dairy records, which is to be presented by Mr. Whitley, of the Dairy Commissioner's staff. I do not think there is any more important subject to claim the attention of the milk producers of Eastern Ontario or any other part of Canada. I believe that along these lines there is more room for increasing the profits of dairying than along any other, and I hope that our efforts in the direction of creating an interest in this work will continue to meet with success, as they have in the past, and I hope to see a very large extension of the work in the future.

DAIRY RECORDS.

By Chas. F. Whitley, of the Dairy Commissioner's Staff, Ottawa.

The keeping of records of dairy cows may be viewed from two distinct standpoints, that of the professional breeder who wishes to sell pure-bred stock on their certified record of performance, and that of the ordinary dairyman who is selling milk. The former it is not intended to discuss now. The Dairy Commissioner's Branch is paying particular attention to the latter, urging the formaton of cow testing associations.

From a business point of view each dairy cow may be regarded as a separate department of one undertaking. It is an elementary principle of sound business to take means of ascertaining that each department pays, that is, that each single individual cow gives a return large enough to pay for food, labour, etc., etc., and leave a margin of profit. Guessing at the total yield will not avail. Memory is too treacherous. The total production of the milking period must be calculated so as to strike a balance with the total cost of the twelve months' food, etc., and ascertain the margin—if any.

It is believed there are hundreds of cows on our dairy farms to-day that fail to yield an annual profit. This is not creditable. National pride of our reputation as a dairy country should spur all farmers to immediate improvement on the present attainments.

To determine the value of cow to the dairyman three questions must be answered. 1. How much milk does she give? 2. How much fat does that milk contain? 3. What does it cost to produce? Such questions are readily answered if a simple record system is adopted. The members of the cow testing associations organized by the Dairy Commissioner's staff agree to weigh the milk of each cow night and morning every ten days right through the milking period, at the same time taking a sample for testing. The time occupied is not more than about four minutes per cow per month. The composite sample is tested free by the Department every month. This is not experimental work. It is practical, common sense business methods applied to the foundation of successful dairying. Cheap milk is the kernel of all farming economy. Milk is dear and sold at a loss to the dairyman if produced in too small a quantity by any cow. No matter what her pedigree, her breed, or her hold on the affections, she deserves no place in the herd if her production is not adequate. Cheaper production means larger dividends.

The value of cow testing associations has been abundantly proved for years in the older and prominent dairy districts of Europe. Scotland, Norway and Sweden, Denmark, Holland, Switzerland and Germany all have them in successful operation. Records have proved themselves not of temporary but of permanent benefit in assisting to build up profitable dairy herds. They are valuable and indispensable to the progressive dairymen, because (1) they assist in distinguishing the good from the poor cows; (2) they guide the feeder in preparing rations economically: (3) they give warning of approach of sickness, and (4) they give inspiration to those aiming for further improvement.

The following tables are based on the records of 16 cow testing associations in Ontario and Quebec in 1906.

Shrinkage in Milk in Two Herds, North Oxford, Ont.

Herd A, 15 cows. Average yield.	1906.	Herd B, 15 cows. Average yield.
lbs.		lbs.
1,024	June	831
843	July	865
663	Aug.	606
631	Sep.	703
3,160		3,005
38%	Shrinkage in 4 months.	15%

Induce Steady and Lengthy Production.

The owner of herd A admits that his cows did not receive as good attention this year as usual, or as much feed. If the shrinkage had been as slight as in the other herd, there would have been 3,840 lbs. more milk from the same cows, or nearly $38.00 more income in September alone. Neglect is costly.

The owner of herd B states: "We were careful to milk at the same time daily, letting nothing interfere. We fed a little oat chop all through the season until the corn was ready. We are generally the first to stable the cows in the fall and the last to turn out in the spring." Even gradual shrinkage is apt to be overlooked, but a record in black and white calls immediate attention to it, crying for soiling crops and better care.

It is not always the cow that starts off in the season with a large flow of milk that is the heaviest producer. The fact that she gave "a couple of pails at a milking nearly all through June" does not mean than she gives 5,000 lbs. during the year. She may decrease much more rapidly than the one in the next stall whose shrinkage in flow is gradual. Estimated totals are almost certain to be in excess of the actual production, and the only safeguard is to weigh regularly. The record should be accurate.

Comparison of Two Herds, Brockville, Ont., 5 Months, May to Sept.

Herd.	No. of Cows.	Total yield.		Average per cow.		
		Milk.	Fat.	Milk.	Test.	Fat.
		lbs.	lbs.	lbs.	p.c.	lbs.
A	6	30,984	873.1	5,164	2.8	145.3
B	12	32,749	1,039.7	2,729	3.1	86.6

Better Cows, Less Work, Much More Profit.

The table given is a comparison of two herds at Brockville, Ont., owned by two men of the same name but different methods, and shows in a striking manner what a man loses through not selecting or improving his herd. In the one case, twelve cows had to be fed, milked and looked after for five months to produce but a trifle more milk than the other lot of six cows. The owner of herd B might go along in blissful ignorance of what his cows might and should do unless he had the record of herd A to stimulate him. The knowledge gained from continued records will save farmers from keeping such poor cows. A few good cows will yield greater profit than a large herd of unselected animals.

Comparative Yield of 3 Best and 3 Poorest Cows in a Herd of 12 Grades, North Oxford, Ont.

These cows calved March, 1906, ages 4 to 11. Total production, 7 months, April to October, 1906:

3 best cows, 17,145 lbs. milk, 723 lbs. butter, $159.10; $48.71 more than the other three.

3 poorest cows, 12,997 lbs. milk, 501.8 lbs. butter at 22c., $110.39.

Best cow in herd earns $24.77 more than the poorest in the seven months.

In the above the six cows may be fairly compared. No heifers or farrow cows are included, just six of an ordinary every-day herd. The 3 best cows produced 4,148 lbs. milk more than the 3 poorest in the seven months; or taking the cash value of the two extremes, the best cow earned $24 more than the poorest. In other herds in this association there were similar differences of twenty and twenty-three dollars in the earning power of mature cows. Production is the best of the value of a cow. Each individual in the herd must be known and the poor ones discarded. The only way to know is by the use of the scales, the Babcock test and a little arithmetic.

Individuality is everything. In figuring out the merits of the herd averages will not do at all. Averages are too kind to the poor cows, hiding their shortcomings, while at the same time they are unduly harsh with the best, dragging their good records down.

Difference between Individual Cows in the Same Herds, Cowansville, Que., 1906.

No. of herd.	Time.	Difference between highest and lowest yields.		Age of cow with lowest yield.
		lbs. milk.	lbs. fat.	
4	9 months.	1,165	53.6	8
6	8 "	940	32.1	4
8	8 "	1,520	49.5	13
9	8 "	1,855	60.5	3
10	6 "	1,350	24.0	5
14	6 "	2,010	33.5	8
27	10 "	3,675	41.7	5
32	5 "	1,680	66.8	6

The table emphasizes this point of individuality showing in eight herds in the Cowansville association the differences between the highest and lowest yield of milk and fat.

In herd 6 the best cow in 8 months gave 940 lbs. milk containing 32.1 lbs. fat more than the 4 year old poorest cow. That difference, large enough as it is, is nearly doubled in herd 9, the 3 year old giving 60.5 lbs. fat less than the best cow.

In herd 27 the difference is 3,675 lbs. milk in 10 months, or 367 lbs. milk per month, while in herd 32 the difference is actually 66.6 lbs. of fat in only 5 months. The indications from this association's present season's records are that there is plenty of room for judicious selection. For instance, in one herd a 4 year old cow in 8 months gave 5,330 lbs. milk and 210 lbs. fat, but a 6 year old in 9 months gave only 3,745 lbs. milk and 140 lbs. fat. One month longer opportunity but 70 lbs. less fat. Similar differences occur in other herds. Such contrasts indicate how imperative it is to test for fat, and to weed out the poor cows. The call to-day is for efficiency, economy and quality in the management of dairy herds. The men who have been successful in building up good herds follow the system of recording. The pathway to success is well beaten, and there is good company along this highway of increasing traffic. The system needs no argument for its adoption; it carries its own recommendation. Judicious selection following such a system means that the average production and profits of scores of dairy herds can speedily be doubled.

In the general pooling and handling of herd milk the yield of any one cow is immediately lost sight of. There is no permanent tangible or visible bulk or weight. Poured into the weigh can it mixes instantly and loses its identity in the general total. Being a fluid it is indistinguishable by its shape, size or color, thus is so radically different from other farm products, the fat steer, plump chicken, luscious berries or ripe grain. To be taken at all, the yield of the individual cow must be noted and recorded at the moment of her milking, then at the end of the season intelligent action can be taken in selection. It will thus be seen that the value of records is indisputable, they are easily kept, cost but a trifle and their value increases as they are continuous. Their use must appeal to every thoughtful dairyman as being of immense and immediate benefit. To an honest mind free from bias or preoccupation the plea is unanswerable. (Applause.)

The Chairman: I am sure you will agree with me in the importance of this question which Mr. Whitley has so clearly and so intelligently placed before you. I am only sorry that a larger number of farmers are not present. You heard this morning from the President's address something about the increased total value of our cheese this year, owing to the very high prices which prevailed. I believe it is quite possible in a few years to be applying this method of selection to increase the total value of the production of milk in this country, by at least $30,000,000. You will never see that increase or anything approaching it from the increased value of our product, for that is the end of the business over which the producer has very little control; but he has control over this end of the business, and it is high time, I think, that those who are engaged in the production of milk, should pay more attention to matters over which they have absolute control, and not concern themselves so much with some other things. We have with us, Mr. Grisdale, who deserves a great deal of credit for the preliminary work which he undertook in this connection, and I will ask him to say something at the present time.

Mr. GRISDALE: This question of dairy records is certainly one which deserves the most careful attention of every dairy farmer. I have been working on these lines for seven or eight years, and the results have been to me almost startling. Mr. Whitley showed you the wonderful difference that might be found among individuals in the same herd, and it is in becoming acquainted with the individuals that we are able to increase our herds. We have a great many men who receive blanks from us, and we invite them to let us have their results, and some of the results are exceedingly interesting. Mr. Ruddick just said it was quite possible to increase our product by $30,000,000, and I must say that I quite agree with him in that statement. I believe it is quite possible, with the same herds, to increase our products from $30,000,000 to $60,000,000, and I base that statement upon the results which I have seen attained by dairymen all over Canada. Take the case of a farmer on the Island of Vancouver, British Columbia. He gave me the results of his work for the last four years. He said, "When I started to keep records of my herd on these blanks of yours four years ago, I found my cows were giving 3,000 pounds. I weeded out the worst ones, and the next year they gave me 4,000, the next 5,000, and this year, 6,500 lbs." That man has more than doubled his return in four years, and what that man has done, others can do. I have a case now in Nova Scotia, where a farmer more than doubled the return from his cows.

A young man in Ontario started in five years ago with a herd whose return was about 4,000 pounds per cow. He kept records, weeded out the worst ones, and the result was that last year he made over 8,000 pounds per cow, and there is nothing to prevent every farmer from doing the same. If a man keeps a record once every ten days, he will at once effect a tremendous increase, because he cannot help paying attention to the care and the feeding of his cows. Take the case of the young farmer I mentioned. He doubled the yield of his cows from 4,000 pounds to 8,000 pounds. That farmer feeds very much better now than he did when he started, and it is absolutely necessary. You cannot get 8,000 pounds of milk out of the same feed that you would give when getting 4,000 pounds, so you see it is not in the selection of the cows, but it is the feed that you give them. The great trouble with the dairy farmers is the lack of care they give their cows. I think you will all admit that if there is any one thing that demands the attention of the dairy farmer, in Canada, it is the improvement of their herds, and that improvement can be brought about by no better means than by keeping a record. In fact, that is the only absolutely certain way of improving a herd. I am glad to see that not only the average farmer, but those who think they are well up in the business, are going into it more and more. I believe it will bring about a tremendous awakening in dairy operations. (Applause.)

The CHAIRMAN: I do not quite mean we can double our production; our export value is $30,000,000. I meant we would increase the total production by that amount. It is quite possible to increase the average yield by 2,000 pounds per year; that has been done time and again. Very much more than that has been done in Denmark, and the Danes are keener on this matter of record keeping to-day than they were in the start.

Prof. DEAN: Having had sixteen years experience in keeping an exact record of a herd, I feel that I might be allowed to say something on this question. I think it is one of the most important lines of work in connection with dairying in this country. I believe that for many years our dairymen have stood still. They were satisfied to judge a cow by her outside appearance, and I say it is practically impossible to judge the value of a cow

by looking at her. There is just one way,as pointed out by Mr. Whitley, and that is to get right down to testing, and find out what each cow is doing. I have a few figures from our records. I find our poorest cow in 1906 gave 3,952 pounds of milk, and our best cow gave 11,499 pounds of milk. There is a difference of 8,000 pounds of milk between the poorest cow and the best. In butter, our best cow gave 465 pounds, and our poorest cow 277, showing you what variation there may be in cows in the same herd, fed under the same conditions, and handled in the same way. I will not bother you with any further figures. I want to show you just what is possible in dairy cows. We have a cow in our herd that in the month of November, 1906, gave us 2,522 pounds of milk, testing 3.5 per cent. of fat. When you think the average yield of milk per cow in the Provinces of Ontario and Quebec is not more than 3,000 pounds of milk, and that one cow in one month of 30 days gave 2,522 pounds of milk, that will show you what a difference there is in cows.

To show you that this cow can keep that up, in the month of December she gave us 2,374, and in 61 days she gave nearly 5,000 pounds of milk, and her test for December was 3.7 per cent of fat. I see no reason why that cow should not another year produce 15,000 pounds of milk, she may run to 20,000 pounds.

Q.—What do you value that cow at?

A.—I think that if she were to be up at auction to-day, she would sell for $1,000. I think we have only touched on the fringe of this question, and the farmers in this country are awaking to the importance of getting better cows. You will notice that recently a bull sold for $10,000 in the United States. Why did they pay that money for him? Because for three or four generations it could be shown his ancestors were bred along dairy lines. I would like to see a breeding station where some men would study this question. This work cannot be done at an Agricultural College, because everybody thinks they have the right to stick their nose in and know all about it, and you cannot study that kind of work where everybody is interfering. This is a question which we dairymen must wake up about.

The PRESIDENT: I have a resolution which I would like to present:

"Moved by D. DERBYSHIRE, seconded by J. R. DARGAVEL, that this Dairymen's Association of Eastern Ontario has learned with feelings of profound regret, that it has pleased an all wise Providence to remove from the scene of earthly usefulness a distinguished member of this board, in the person of the late Henry Wade, of Toronto, a former presiding officer of this Association. He discharged the duties of office in a firm, yet courteous manner, that won for him the highest respect of his fellow members. Resolved that the Secretary send our heartfelt sympathy to the widow, relations and friends, in this hour of their affliction."

The CHAIRMAN: I do not think I need to add anything to what is expressed in the motion. It was my pleasure to know Mr. Wade for a good many years, and I learned to know him as one of nature's gentlemen. I am sure we all regret that he has departed from amongst us. The resolution was carried by a standing vote.

ADDRESSES OF WELCOME.

The President, in taking the chair at the afternoon meeting, spoke of the splendid manner in which the City Council and Board of Trade of Ottawa had acted toward the convention.

Hearty addresses of welcome were then delivered by Mayor Hastey, Ex-Ald. Hopewell, and Messrs. John R. Wood, J. R. Reid, and Cecil Bethune of the Board of Trade.

In reply, the President expressed himself as delighted with the reception given the Association. "Of course we expected it from the nice way you treated us when we came among you four years ago. We had a convention here twenty years ago and nobody paid the slightest attention to us. We were not very much of an institution that time, but to-day they recognize us everywhere we go, and they are bound to know something of what we are doing, and that we are the industry that is leading Canada in connection with progress. You will be delighted to know that we have more than doubled the exportation of butter and cheese and bacon in the last four years, and we hope that, with the addresses we will have at this convention, we will be able to build up this industry in this locality.

ECONOMIES ON THE DAIRY FARM.

By J. H. Grisdale, Agriculturist, Experimental Farm, Ottawa.

I want to draw your attention for a short time this afternoon to economies on the dairy farm,—the best management and methods of carrying on the work on the dairy farm for the production of milk. Let us review very briefly the history of agriculture in this country, and when I say this country, I mean Eastern Ontario and Quebec.

We see the farmer clearing up a little bit here and there, and fencing it around to keep the cattle away. He pays very little attention to the feed the cattle receive during the summer, his great ambition being to get a little more land here, and to keep it from the inroads of his cattle. As a consequence of this we found a few years ago that the farms were divided up into a number of small fields. Dairy cattle were introduced a few years ago, and they have been increasing in numbers, but the farmers have not been making the progress they should in the management of their farms and the arrangements of the fields, and I think it it is time to make a change.

The great ambition of the dairy farmer should be to keep as good cattle as he possibly can, and the Department of Agriculture has been working to help the farmer in this particular by advocating tests of herds, and by forming testing associations, and all this work is good in its way. The better we can make our herds the more profitable the dairy business will be for Canada and for every individual engaged in it. After we get the best cattle, we then want to keep them as well as possible, not only in winter but also in summer. If I may judge from the conduct of the average farmer in this country, winter seems to be the chief time when he is ambitious of care for his cattle. He is always thinking of how he will get enough feed for his cattle during the winter, and we often find them wandering about in the summer looking for feed. If the grass is good they are all right, but if we get a dry spell and the pasture fails then the average farmer has no provision made for feeding his cattle. Cattle should be well fed both in winter and summer. Therefore I say the best thing is for the dairy farmer to get a herd of the best animals he can, and then keep them as well as he can, and thirdly he should make that herd as large as possible, because in the increasing of our dairy herds lies the future of this eastern part of Ontario. We have a limited number of farmers, and there is a limited amount of land, and, if

we are going to make the progress that we should and develop the dairy industry, we must do it by increasing the number of our dairy cattle, and by increasing the production of the individual cow. We cannot be satisfied to hold the place we now hold. Surely we will not be satisfied, fifty years from now, to be able to say that in the year 1906 we produced so many million dollars worth of butter and cheese, and we are doing as well to-day. I hope to see this part of Ontario, ten years from now, producing twice as much butter and cheese for export as we are producing to-day, and I feel confident that this can be done by improving our herds, feeding them better, and increasing their number, and they can be kept on the same land as we now have under cultivation.

In order to do this the farmer must study the best means of cropping his farm, and the subject I have selected for this afternoon is, "How can we manage our farms so that we shall be able to make the cattle we have produce a greater quantity of milk, feed them better, and increase our herds?"

In the first place, I think, if we are going to do this, we must change our methods, very largely, in the handling of the land and the arrangement of the fields. In my experience there is no work which will give greater results than the one to which I wish to draw your attention, that is the dividing of our farms into regular equal fields, and having them so arranged that we can follow rotation and get the greatest results with the least labor. During the last few years we have tried a large number of rotations and a number of methods of cultivation, and the system outlined has given the best results. I have tried it, and have seen it tried, not only on the Experimental Farm here at Ottawa but on various other farms, and every place where it has been tried the results have been simply wonderful. Supposing you have a one hundred acre farm of arable land, take one-eighth of the farm, and in one corner one-sixteenth is set apart for paddocks or small fields for young cattle or for putting cows in at night. On the other side he has a vegetable garden and orchard, and three or four acres for swine. The dairy industry and pork production are inseparable, we must combine the two, and in order to make the production of bacon successful, we should have a small area of land devoted to it. On the Experimental Farm we have ten acres devoted to pork production, and there is no portion of the farm that gives a return equal to that ten acres.

The rest of the farm, which will consist of three-fourths of the total area, or 75 acres, is divided into four equal fields. We cannot always get them in that way, but we can get them as equally arranged as possible. Try to have some part of each quarter of the land near the buildings so that it can be used for pasture at night. Divide it into four equal fields of about 19 acres each. This field near the barn in 1907 would be pasture. In 1908, follow with a crop of corn or roots or potatoes; in 1909, with a crop of grain, and at the same time sow clover and timothy, from ten to twelve pounds of clover per acre, and about ten pounds of timothy. If you have very strong land that may possibly be too heavy a sowing, but I have never seen a heavy sowing fail. After the hay we have it a year in pasture. Three-fourths of the area, or 55 acres, is devoted to crops for winter use. If we are going to make a success of our dairy farms we must consider feeding the cattle in summer more carefully and more generously than in winter, because that is the season of the year that the average farmer makes his harvest from the cattle. Every farmer can pick some field close to his barn, and devote it to the care of crops for summer feeding, even if he should have other means of feeding his cattle in summer, and even if he should have sufficient pasture. Pasture

is the most expensive method of feeding cattle. He will find it profitable to grow crops suitable for summer feeding. I have found that the best method of growing crops for soiling is to select a portion of the farm adjacent to the buildings, and divide that portion into three equal fields. Have a field of six acres divided into three fields of two acres each, and follow the three year rotation; first year, one field of clover, the next field mixed crop of oats and vetches, and peas and vetches, sowing about four bushels per acre, and after that mixed crop, sow red clover and alfalfa, using about 18 lbs. of clover seed per acre. In the third field we have corn; sow two varieties, an early corn and a late corn. Change the rotation in each field so that each year we will have a crop of clover, mixed grain and corn. In this way we have a succession of green feeds that last from the middle of June, right through to September. The alfalfa is as early as the 5th of June. You must be very careful the land you put in alfalfa is well drained. It should be on a hill or a slope, where water will never lie winter or summer.

We have found the Longfellow and Leaming corns to be the best varieties. Longfellow will be available about the 15th of August, and the other will come in succession, and last until the end of September. On most farms I have visited I have found the proportion of crops for summer and winter use quite different, and I say we must change that, because it is in summer that we get our returns from the cattle, and we should give them more attention than we do. I travelled a good deal in this district last summer, and I found hundreds of herds not giving the milk they should, because they were starved. They had nothing to eat, and that state of affairs might have been changed had the farmers given the attention to summer feeding that they should. There is always some part of the season when soiling crops will grow, and they will maintain their bulk during a dry season. I know dozens of farmers who are following this method of cultivation, or something similar, and everyone of them that I visited said that their cows were giving as much milk as usual, although farmers who had not followed this method were receiving very little milk, and some of them stopped milking their cows in September.

What are the advantages of such a rotation besides providing feed for dairy cattle in summer? The advantages are simply remarkable, because this rotation not only provides food for the cattle the year around, but it also enables you to keep more cattle on the farm. Five years ago a certain farm was taken over by a friend of mine and this system of summer feeding was introduced. The first year was a good year, and yet he was only able to keep on that farm 15 head of cattle, and he had at buy $200 worth of rough feed to winter them, and last winter he wintered 29 head of cattle and sold hay, and that was due to his having followed this rotation. Fields that were giving a ton, and a ton and a half per acre gave, last year, three ton per acre, and last year was a bad year for hay. The year before that gave him five ton per acre. He used no other fertilizer except barn-yard manure, and he kept 29 head of cattle, 4 horses, and a number of swine, and only bought $50 worth of meal. His cows gave him $55 worth of milk apiece in the summer. You may follow a five year rotation if you like but I know of no rotation that will quite come up to the four year rotation.

Many of you are familiar with the results obtained by that thinking chap over in Philadelphia, who took a little bit of a farm a number of years ago and set to work to see what he could do with it. There were only 15 acres on the farm, and it would not grow enough for one cow and a horse, and now it is keeping thirty head of cattle right along and selling hay off that 15 acres. When he took the farm it cost him money to keep it, and how

many farms are there to-day that cost you money? I can name you a dozen farmers who are not earning wages. That is the kind of thing we ought to change and we can change it if we try. This farmer near Philadelphia had to use his hard earned cash to keep the farm running at first, and to-day he is making a revenue of $3,000 a year, and that is what I call farming.

A Member: What does he sell?

A.—Milk.

Q.—What year do you manure?

A.—We always manure with the corn. I have not said a word about cultivation of any of the crops; I just want to impress upon you the method of rotation. After the pasture we leave it in sod all winter and haul the manure out during the winter time and spread it and plow it down about the 10th of May. Plow four or five inches deep and then roll it again and disc-harrow again once or twice, and then you will have a seed bed fit for onions almost, and, when you plant corn on it, it cannot help but grow. It has got to grow. You must get the land properly cultivated for corn. You will have the warmth and the necessary moisture and the vegetable food and the corn cannot help but grow. If you are going to plant roots you had better plow in the fall, especially for mangels. I think the best method for corn land is to plow it first. We have disked it and turned it over one way and another, but the good old way of plowing is the best.

Q.—What about the hay crop?

A.—It will not be so rich in clover, although it will be richer in clover than if you had two years of hay in succession.

Mr. Ness: Is it not the case that, where you put the pasture after the grain, you will find some bare spots?

A.—Yes, you will have a few bare spots because you cannot prevent the cattle from tramping. A good thing is to have two entrances to the field, and then it will not be broken down so much. We have followed a two-year rotation on our land; no hay. Supposing a man has land where he can grow his hay. We find we can keep two cows per acre during the three or four months of pasture time and get a very fair return, but if you put two cows per acre on old pasture it would be bare in two weeks. If you harvest the hay off that field you can feed four cows per acre, and that will show you that pasture is the most expensive method of feeding cows that it is possible to follow. By putting them on old pasture you are throwing the land away. Of course there is a certain good effect on the land by allowing the cows to roam over it part of the season. You will get more corn the next year after pasturing the land, perhaps two tons per acre more, but you will only get a return of about $8 per acre when it is in pasture, and when it is in hay you will get a return of about $20 per acre. Do not devote half your farm to pasture, because, although you are economizing in labor, you are throwing away half the value of that part of your farm, and, if it is old pasture, you are throwing away three-fourths of it.

Another point is the importance of having supplementary feed for your cattle. Some of you would say, "Would it not be better to have silage for your cattle in summer?" Yes, it is better but they like the green crops better than they do silage. We fed our cattle entirely on silage last year and they did not do as well as when on green crop.

Mr. Stuart: Is there any system of feeding equal to grass?

A.—If you take June grass in a year when there is not too much rain and put the cows on it in pasture, that will give them all they want without walking a mile to get it, and I do not know any feed that will then come up to it; but you can easily have too much grass or too little grass, and that is

where the man comes in. He should use his brains and have just as much feed and use it economically. Supposing Mr. Stuart is right, and that there is no feed which comes up to grass; there is no feed equal to a sufficiency of the right kind of grass, but there is a very much better feed which will give almost as good results in the way of milk, and very much better results when it comes to your pocket. I think that limiting the pasture to one field of the whole area of the farm is a method that is going to give the best results.

Q.—Would you think it advisable to have your pasture in four different fields, and change your cattle from one pasture to another?

A.—Yes, there is an advantage in that; but when it comes to plowing time you have to take down your fences or lose a lot of land along the fences.

Q.—You would not consider it worth while to put up a temporary fence?

A.—I have tried that, and it does pay for the labor of putting up the fences. We have a herd of about fifty at the Experimental Farm that we pastured last year, and for that fifty head we had fourteen acres of pasture land. Of course they did not live on it, but they lived on it almost entirely a couple of months. All they got in addition to the pasture was a little bit of meal. We kept them in in July and August in the daytime and in September we kept them in at nights. The fifteen acres was in alfalfa. What I want to call attention to is the importance of planting the farm so that the cattle will have a good supply of food in summer as well as in winter, and have food of a cheap character. It is not enough to give them feed regardless of cost; we must study economy.

The following circular has been sent from the Central Experimental Farm to dairy farmers:

Every year every dairy farmer loses much money on account of the scarcity of grass or by reason of the unprofitably large area of land that has to be used to insure good pasture during the months of July and August.

If the average dairy herd is to be profitable, every cow must be kept up to her full capacity during those two months, as well as during the preceding and succeeding months.

The quantity of milk produced during September, October and November is very materially influenced by the way in which the cattle are fed in July and August.

Cows receiving insufficient food during those two months naturally decrease very rapidly in milk flow. Once the milk yield is materially decreased for any considerable length of time, it cannot during that season be again brought up to what it might otherwise have been.

Hence although pastures are usually good or feed plentiful during the months of September, October and November, when prices for cheese and butter are high, we must, in order to get the full benefit of these high prices and abundant supplies of feed, have been feeding well during the months of July and August.

The cheapest, easiest and most certain plan of insuring an abundance of feed during the months of July and August is to make use of soiling crops.

Experiments at the Experimental Farm as well as elsewhere would seem to indicate: Vetches, pease, oats, clover and corn, as the most suitable crops for the purpose.

Dairy farmers are therefore recommended to prepare and feed somewhat as follows for each 10 cows in their herds:

1. Clover, 1 acre: To have been sown with the mixture of pease and oats the previous year as described below.

Feed off June 20 to July 15.

2. Pease and oats., ½ acre: Sow 1 bushel pease, 1½ bushel oats and 5 lbs. red clover seed on ½ acre of land about the first week in May.

Feed off July 15 to 31.

3. Pease and oats, ½ acre: Sow same mixture on another half acre about 3rd week in May.

Feed off August 1 to 15.

4. Corn, ½ acre: Sow 10 lbs. Longfellow corn (or other small variety) in hills 3 ft. apart each way. Sow 3rd week in May or as early as possible. Sow on well drained land, clover sod manured at rate of 20 loads (tons) per acre.

Feed off August 15 to 30.

5. Corn, ½ acre: Sow 12 lbs. Leaming (or other medium variety) same way as above.

Feed off in September.

Mr. L. PATTEN then took the chair, and said: I am sure we have all been interested and profited by this address and if there are any more questions I know that Mr. Grisdale will be pleased to answer.

Q.—Have you had any experience in making alfalfa into hay?

A.—Yes, it makes good hay.

Q.—Alfalfa or red clover and alfalfa?

A.—We have always succeeded in getting it very well cured except in a rainy season. Where we have grown alfalfa by itself it will cut from five to ten days ealier than where you have red clover with it. Where you mix them together the second crop is largely alfalfa and the third crop is practically entirely alfalfa. Where you mix them together for hay the red clover kills out the alfalfa in the winter or the first crop in the spring. We get the best results for hay when the alfalfa is sown pure, and it will last as long as you like. We have some plots where it has been grown twelve or fifteen years, and it has proved as hardy as red clover. The only field that came through last winter was alfalfa. Every field of red clover was killed.

Q.—Do you feed ensilage alone?

A.—We give meal.

Q.—According to your system, how many cows would 100 acres carry comfortably?

A.—That is a hard question and if I answered it according to my belief you would think I was exaggerating.

Q.—100, I suppose?

A.—It would carry 100.

Q.—The next trouble would be to get help?

A.—It means taking a little more care of the milk and paying higher wages. According to our friend in Philadelphia it would carry 200. I would not go as far as that, but there is nothing to prevent your carrying 75. We have a 200 acre farm and we are carrying 110 in summer and 150 in winter, and we do not buy any feed except meal. We have over 20 head of horses, and we do not buy any hay for them or any roots.

Q.—You get a lot of manure from the city?

A.—No, not for the farm; the orchard gets some, but we get no feed from the orchard.

Q.—Do you buy any fertilizer?

A.—No.

Q.—How many hogs can you keep on 100 acres?

A.—I would keep the hogs in proportion to the number of cows, the two go together. A man ought to keep about four pigs for each cow, and supposing he has 20 cows he ought to have about 80 pigs. He should have ten

or a dozen little chaps; ten or a dozen a couple of months old, and ten or twelve further on, and so on, and then he would be using his by-products to the very best advantage.

Q.—Would you advise keeping sheep?

A.—No; I have no objection to a man keeping sheep, but I think sheep and beef cattle go better together than sheep and dairy cows. (Applause.)

The CHAIRMAN: I think Mr. Grisdale has touched the key-note of the situation from the dairyman's standpoint, and I am sure his address is one that has been instructive and profitable to everyone here.

STABLE HYGIENE.

By DR. J. G. RUTHERFORD, LIVE STOCK COMMISSIONER, OTTAWA.

I was much impressed with Mr. Grisdale's remarks. Extensive occupation of land is one of the great curses of agriculture on this continent. There is nothing more painful to the student of agricultural methods than to see the manner in which people scatter their energies over large areas of land, producing practically nothing to what they would be able to produce if they were to centre themselves on the principle of intensive cultivation. You see that even in the Old Country. It is always a very sad thing to me to see a very large area of land that is not being properly cultivated. Just across the channel in Belgium and Holland farmers are bringing up large families on two or three acres of land. In the country where I lived a good many years, Manitoba and the west, our people are just simply crazy on extensive occupation of land. If they were to devote their time and attention to much smaller areas they would succeed far better. It is possible for the dairy farmer of Eastern Ontario to succeed in maintaining in comfort and in plenty a very much larger number of animals than is generally supposed to be the case.

I want to say a few words to you on a subject with which I may, perhaps, claim to be more familiar, and one upon which you will give me, perhaps, a better hearing, that is the subject of stable hygiene, which is one of very great importance to the stock owner. Embracing, as it does, a large number of widely differing branches each capable of almost indefinite elaboration, it goes without saying that, on an occasion of this kind, it will be quite out of the question to attempt to deal with it as it deserves. I shall, therefore, with your permission, confine myself to the discussion of the practical side of the subject, qualifying the expression of this intention, however, with the general statement that the views expressed are, in almost all cases, in strict accordance with the results of scientific research. In some instances I intend to advance theories of my own, the fruit of personal observation or investigation; but on these, as in others, I hope, in case of discussion, to be able to give satisfactory reasons for the faith that is in me. I have no wish to dogmatize, and having no pretensions to universal knowledge on any branch of the subject, am only too willing to benefit by the larger experience of better information of any one present.

Parkes, the greatest authority on the subject, defines hygiene as "The art of preserving health." He says: "It aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote." He also declares that, with a practical application of a perfect knowledge of the laws of life, disease would be simply impossible. That knowledge, however, we

do not know, nor are we ever likely to possess it. We must, therefore, as in other lines of life, walk according to our light, making the best use of the information at our command.

Stable hygiene is a plant of comparatively recent growth. Little more than a century has elapsed since Prof. Coleman first advocated the intelligent application of the principles of sanitary science to the domestic animals. The success which attended his efforts rapidly revolutionized stable management in Great Britain, and he and his successors in the good work have undoubtedly saved many millions of pounds to the stock owners of the civilized world. Even yet, however, there is considerable room for improvement in most stables, while in a new country such as ours, especially with its peculiar climatic conditions, there is much to be learned as to the most intelligent, and therefor the most profitable, methods of housing and managing live stock. Before going into detail I wish to guard against misunderstanding on the part of any of my auditors in one particular. I have lived nearly a score of years in Manitoba, and am sufficiently familiar with the conditions of life on the Western farm to be well aware that some of the theories I am about to advance cannot possibly be adopted in all cases. To those who may be inclined to advise criticism on this ground, I would point out, that after all, it is only a question of degree. If one cannot, through force of circumstances, adopt hygienic methods altogether, he should at least do so as far as he can. As we say in my profession regarding wounds, "If your treatment cannot be asceptic, let it be as asceptic as possible.' The experiment will be well worth trying, and the results gratifying beyond expectation.

Ventilation. No stable can be healthy without a plentiful supply of fresh air, and in our severe climate the problem of efficient winter ventilation is one of extreme difficulty. A lengthy and most interesting essay could be written on this subject alone, and it is with regret that I feel myself on this occasion forced to treat it with more brevity than its importance merits.

Pure atmospheric air is composed of oxygen, nitrogen and carbonic acid, in about the following proportions. Nitrogen 78.98, oxygen 20.99, carbonic acid 0.03 in each 100 parts of air. The nitrogen is simply of use to dilute the oxygen, being of itself incapable of sustaining life. Under ordinary conditions otherwise pure, contains in the gases mentioned, moisture, traces of ammonia, floating particles of organic and inorganic matter and more or less ozone, which last is only another form of oxygen. The ammonia contained in air is not of itself hurtful, but when excessive indicates the presence of other impurities.

Of oxygen, according to Mr. Angus Smith, a pure air contains, as I have already stated, 20.99 per cent. and average air 20.98 per cent., while very bad air begins at 20.96 per cent. As oxygen is very rapidly consumed in the process of animal respiration, these figures have a striking signification.

Carbonic acid, when existing in the air to a greater extent than .03 per cent. or .04 per cent., is proof positive of a reduction in the amount of oxygen, and an increase in the organic matter. The expirations of a healthy animal contains 19 per cent. instead of 21 per cent. of oxygen, and about 2 per cent. of carbonic acid. It will thus be readily seen that the air in a stable full of animals and without proper ventilation soon becomes overloaded with carbonic acid. The sense of smell is a very good way of detecting the presence of carbonic acid. Taking .04 per cent. to start with and allowing .02 per cent. for ordinary inside air, we have .06 per cent. of carbonic acid. Now,

according to Dr. Angus Smith, the existence of .08 per cent. is unpleasant to most of us, while the presence of one part per thousand in the air of a room renders it odious and unwholesome. Experiments have shown that in badly ventilated stables the air may contain as much as 17 parts per thousand of carbonic acid, with, of course, its accompanying proportion of organic matter. The effects of such an atmosphere on the animal economy are indescribable, especially when we consider the lack of oxygen and the large amount of organic matter thus shown to exist. Let us see what this organic matter consists of. That found in the air of stables comprises, according to Prof. Fred Smith, of the Army Veterinary Department, cast off epithelium or scales from the mouth, air passages and skin, organic vapors from the lungs and skin, spores, acari, fucuses in fine division, and vapors derived from the decomposition of materials from the intestinal and urinary passages. Among these organic particles have been found many varieties of disease germs, such as those of anthrax, tuberculosis, and glanders. When we consider that the mucous membrane of the respiratory tract in the horse has an area of nearly 300 square feet or over five times that of the outside skin, and that every portion of this surface is especially adapted for rapid absorption, we must admit, without further argument, the necessity of thorough ventilation if we desire to keep our stock in good health and condition. I could quote many most interesting facts and statistics showing the wonderful results achieved by the introduction of effective ventilation in army stables and similar large establishments, but time will not allow me to do so, and I must pass on with another terse quotation from Dr. Parkes who affirms that "Disease and health are in the direct proportion of foul and pure air." The amount of air inspired by a horse varies greatly, but when standing still it is as a rule not much over 100 cubic feet per hour. In order, however, to afford him this quantity of reasonably pure air in the stable, Prof. Fred Smith, basing a most careful calculation on the quantity of carbonic acid exhaled, proves conclusively that it is necessary to furnish him with no less than 15,000 cubic feet per hour. This theory, which I may say I consider incontestably correct, has had a remarkable effect in dispelling the erroneous ideas of many architects in regard to the value of cubic air-space, which, while certainly very important, can never take the place of a thorough system of ventilation. The greater the air space in the stable, the less frequently need the air be changed, but this, important as it doubtless is, constitutes its only value. For instance, a horse having 500 cubic feet of air-space alloted to him, must in order to obtain his 15,000 cubic feet of fresh air have it changed thirty times per hour, while one with an air space of 2,000 cubic feet will only require it changed 7½ times. Again, while the first will require during the first hour 14,500 feet of fresh air and the second only 13,000, both will, during the second hour and each hour thereafter require the introduction of an equal amount, viz., 15,000 feet. I have given this subject more careful thought, and I am satisfied that while in moderate weather we need have no great difficulty in reaching Prof. Smith's standard, we cannot hope to do so during the severe winters of this country. We must, however, do the best we can, and as I am fairly well satisfied with the results of my own experience in regard to ventilation in Manitoba, I propose to lay them before you and to let you judge for yourself. I may explain, that having experimented for years with all kinds of ventilators, I was, like almost every one else, very badly satisfied with all of them, and inclined to despair of ever finding a system in which the inlet would always be an inlet and the outlet always an outlet. I got my first start from a very intelligent English farmer who was on a visit to the Province some eight

or nine years ago. He recommended placing U pipes under the wall behind the horses and drain tiles through the wall over their heads, but was forced to admit, on cross-examination, that when the wind blew in through the latter, his ventilation went on strike till it changed. I adopted the U pipe part of this plan, using, however, wooden boxes, but substituted suitable side louvres at the top of a large shaft running to the roof, for the drain tiles. These, however, were not a success, for the wind was sometimes in the opposite direction in the morning from that in which it had been at night, and on such occasions the stable "smelt to heaven." I finally closed up the louvres altogether, putting in instead a galvanized iron pipe or chimney of considerable dimensions furnished with on ordinary rain cap, and a large damper manipulated by cords from the stable floor. When this damper is open, the foul air, being warm, rapidly rises, passes out through the chimney and is steadily replaced by fresh air sucked through the U pipes or boxes. By closing the damper the inrush of air through the lower pipes is at once checked, while a partial closure has a corresponding partial action on these inlets. In this way the whole system is under easy control, and can be adjusted to suit the weather or the number of animals in the stable. My stable is not ceiled, but I think the system would work even better if the ceiling sloped slightly upward to the outlet shaft. There is no draft, as the fresh air is sucked—not driven—in, and therefore diffuses itself gently through the stable. This plan has stood a fair trial, having now been in operation for upwards of seven years. I must say that I would not exchange it for any other system of winter ventilation I have ever seen, and will not, therefore, occupy your time by describing other methods. By this plan a stable can be kept free from odors, and at a temperature during the coldest weather of from 35 to 40 degrees Fahrenheit, which is quite warm enough for healthy animals of any kind.

The whole tendency of the medical profession at the present time is to get back to nature in regard to human life, and if this is the case with regard to ourselves, if it is true that people should sleep with their windows open and out doors if possible, why does it not stand true to a very much greater extent with regard to horses and cattle. I have a herd of cattle that were at the dairy farm at Nappan and were badly affected with tuberculosis, and they were going to kill them, and I asked the Hon. Mr. Fisher that these cattle should be given to me, and we brought them here. We kept them out doors at Nappan all last winter, and we brought them here in the spring, and they are now living out doors over here on the Quebec side of the river. They have an open shed where they can run in from the snow and rain, and they are in the bush, and they are out doors. There is no trouble there with ventilation, I can assure you; and it is very interesting to watch the calves arrive with their overcoats on. I can assure that if you keep cattle in stables where they are protected from the wind and rain, but where the temperture is just about freezing point, and take young growing animals and horses, you will be surprised how well they will eat, and how much healthier they will be. (Applause.)

Mr. Henry Glendinning: You will notice that I am on the programme to open the discussion upon Dr. Rutherford's address. You may be a little surprised when I tell you that I didn't know what Dr. Rutherford was going to say until he said it, therefore, I am not in very good shape to open the discussion. However, the President tells me that I am to open the discussion on Professor's Grisdale's address as well.

In the olden days bran was wasted; you could get it for four dollars a ton. The farmers thought there was nothing in the skin of the wheat; but

for years back the experimental stations have been preaching up the value of bran, and they preached it up so high that you can hardly buy it at twenty dollars a ton. How much is there left to the farmer when he buys bran at twenty dollars a ton? Although the price of dairy products has been high, the net profit to the farmer when he buys a large amount of feed is not very much. Is there anything that we as farmers can feed to our cows that will take the place of wheat bran? I believe that you will all agree with me that wheat bran is one of the best feeds for dairy cows. What is there in it that makes it so good? It is the nutriment that we call protein. We find all the feeds for the production of milk contain protein. Is here anything that the farmer can grow on his farm that will take the place of bran? Some one will say that we can raise oats or peas, but are they not higher than bran? Mr. Grisdale told you that for a number of years they have been growing alfalfa at the Experimental Farm. He said they had it there for ten years continuously. We have nearly as much digestible protein in a ton of alfalfa hay as we have in a ton of wheat bran. That being the case, and I have found it to be nearly as good. I think it is better than bran, because we have the advantage of being able to produce it cheaply. I believe you can get it into your barns and pay for all labor in connection with the growing of the hay, and put it into your barns at from $2 to $2.25 per ton. The stock are very fond of it, and if you have a lot of that feed in your barn, you will be in a good position, and you will have made at the end of the season a good deal more money from your cows than if you had to depend on bran. I have been experimenting with alfalfa. I have been growing it for ten years. Although my first experiment was not satisfactory, we finally succeeded in getting a good stand, and we can keep it growing from year to year. Last year my alfalfa fields were bare during the whole winter, we had scarcely enough snow to make the fields white, but when the spring came it never looked better, and we had the heaviest crop we ever had on the farm. I am satisfied we had seven tons to the acre. I do not want to say that you can produce that on every acre, but I am sure where you can grow alfalfa successfully you can always count on a very large crop. We have never grown less than five tons to the acre. And if you can succeed in getting four tons to the acre and something practically as good as bran, is there anything else you can grow that would be as good for feeding to milk cows. When we feed alfalfa hay and good corn silage we have the best results. I would not ask you to grow less corn. But I would say grow a great deal more alfalfa.

I had been reading about a certain culture that you apply to the seed, and last spring I thought I would try it, and applied to Prof. Creelman for enough to treat two bushels of alfalfa seed. We followed the directions they gave us, and we were very careful that the seed did not mix with the other seed that had not been treated. It was sown with a nurse crop of three pecks of barley per acre, and in many cases with the seed that was treated with the culture, the plants were as tall as the barley, standing at least three feet high. I do not say they were all that high, but many of them were. I did not see the untreated field the whole summer, but my son, who was cutting the field, said that there was part of it that would have to be plowed up. I asked him what part of it, and he said that part that we did not treat with the culture. I went up and looked at it, and found plants only two or three inches high, and they were weak sickly plants, while on the treated part every plant was robust. And when we have such marked results as that, I have no hesitation in recommending that culture to farmers who have never grown alfalfa on their farm. With the first piece of alfalfa I grew on my farm the plants

were very small and weak and sickly looking, just the same as those that were not treated. We sowed that field for hog pasture the second year, and the next year the hogs pastured on the field and ran into the adjoining field, and so carried the manure from one field to the other, and carried the dirt into the adjoining field. And that field that was run over by the hogs from the alfalfa pasture had as strong a catch as we get from the field with seed that was treated. I believe that the hogs had the effect of inoculating the whole of that field so that we had a strong growth of these young plants. The field where the seed was planted that was not treated had only recently been put on alfalfa, and that is the reason why I thought the culture gave such good results. If I grow any alfalfa next year I am going to apply to Prof. Creelman for the culture.

Q.—What do you think about leaving cattle in the stable down to zero?

A.—I think it is of great importance to have fresh air in our stables. They should not be too hot. In going around to our institute meetings, they have a big fire in the hall, and they have the windows down, and it is not very long until the place is very uncomfortable: and I fancy that cows are like the human beings, they want comfortable quarters too. Very warm quarters are not comfortable, and I think pure air is more essential than warm air. I think there is one thing we lack in this country, and that is ventilation, not only in our stables, but in our dwellings and public halls; and I think Dr. Rutherford should preach that from one end of the country to the other.

Q.—How much alfalfa seed did you sow to the acre?

A.—Twenty pounds. I believe that with that treatment we get a safer catch from fifteen pounds that we would from twenty pounds because every seed appeared to grow. Mr. Grisdale said that they had been growing five or six pounds alfalfa seed in his experiments to red clover, and he found the red clover has a tendency to smother out the alfalfa. I think that is all right where you want to cut and plow it, but that would be no good on the line on which I am talking, because the red clover is a biennial plant, and at the end of two years it dies, therefore we have to put in plenty of seed. One remark I have heard people make with regard to alfalfa was that it was too coarse. That depends on how thick you grow it. If you plant it thin then it will grow long and coarse, but if you plant it thick it will be very much finer; therefore, I say, put on plenty of seed. Do not pasture your alfalfa fields. It is all right in Mr. Grisdale's case, because he intends to plough it up. I lost my first alfalfa by pasturing it. At the entrance of my alfalfa field where the implements and horses go in to cut the alfalfa it is getting thinner and thinner all the time, and I think it is due to the tramping. I think alfalfa can be grown in the greater portions of the Province of Ontario on high land. Nearly every man has high land that is well drained, and there I would say put in a piece of alfalfa.

Q.—What effect would a top-dressing of manure have on it in the winter?

A.—We have never top-dressed our alfalfa field with any more than three loads to the acre. We have top-dressed with wood ashes, and they gave a very marked result.

Mr. KIDD: How many times did you cut this crop that you took off seven tons to the acre?

A.—This field has been cut four years, and cut three times each year, with an exception of a year ago, then it was only cut twice, because one of the crops was a crop of seed.

Mr. GRISDALE: Did you get any seed?

A.—Yes, I got about a bushel to the acre. I do not think it will pay from the money standpoint, but I think it would pay perhaps in other ways. I had the advantage of having a good quality of seed, and that is a very hard thing to get, as so much of the alfalfa seems to be full of rib grass.

Q.—Do you think it is possible to keep these stables comfortable and still keep them fresh?

Prof. RUTHERFORD: I certainly think it quite possible to keep either horses or cattle, milking cows, feeding cows, feeding stock or breeding stock perfectly comfortable with an adequate supply of pure air.

Q.—Fifty degrees?

A.—No; you cannot keep them at fifty degrees and give them an adequate supply of fresh air.

Q.—What degree should a stable be kept at?

Dr. RUTHERFORD: Anywhere between thirty and forty, in my opinion quite warm enough. Of course for young growing stock, horses, or young cattle I do not think it necessary to keep them that warm, if they get absolutely fresh air.

Prof. DEAN: I do not agree with Dr. Rutherford. I do not favor this extremely low temperature for milking cows. I do not think it is possible even with the cows which we have now to get yields of 8,000, 10,000, 12,000 and 15,000 pounds of milk if you keep them at a low temperature of thirty or forty degrees. I am a great believer in fresh air, and in our own stable we have a system which I think works quite satisfactorily. We bring in fresh air at six different points in the stable so that it is distributed at the ceiling. I must again differ from the Doctor when he says the foul air in the stable would all be at the ceiling.

Dr. RUTHERFORD: I say the foul air rises, and if so will go out at the ceiling.

Prof. DEAN: I think you will find considerable of the foul air on the floor as well. The objection I have to ventilating from the ceiling is that you cool your stable too rapidly, and by having a system of ventilation which has an opening both at the ceiling and at the floor I think is much better. We aim to get our stables at about fifty-five degrees. I like plenty of fresh air; but if you want the best of results in milking I do not think you should let your stable go as low as thirty or forty degrees. At temperature in the day time of fifty to fifty-five degrees would give good results, and at the same time give healthy stock. Since we put in this system of ventilation we have not had a single case of tuberculosis, and as far as I known there is no tuberculosis in our herd.

Q.—Explain that system of ventilation?

A.—You will find it fully described in Bulletin 143 of the Department of Agriculture.

Dr. RUTHERFORD: I think my system is the best. I think the system Prof. Dean has described is a very good one, but it has several faults. I do not question Prof. Dean's statement that he could get for a year or two more milk from a cow under hot-house conditions. I remember one professor at the Ontario Agricultural College advocating keeping a cow tied up by the neck all the year around as the most profitable way of getting a larger supply of milk. I do not believe in hot-house plants, and I do not believe in hot-house stock. I believe in animals being kept in their natural condition.

Mr. D. M. Macpherson: These are important questions—the yield per cow, and the life of a cow. I have listened with a great deal of pleasure to Dr. Rutherford's explanation of a system which is a very good one. There does not seem to be very much difference between his and Prof. Dean's except that Dr. Rutherford keeps his cattle cooler. It is quite evident that a considerable quantity of the carbonic acid goes up, but from the experiments that have been made, a certain portion falls to the floor when the temperature rises to a certain degree. It seems to me that you could combine the two systems and draw a portion of the foul air from the bottom, and a portion from the top, and take in sufficient fresh air that you would have perfect ventilation.

I would like to discuss Mr. Grisdale's interesting address. I have given a life time to the study of the economic production of milk and the work of the farm, and I have tried his system. I think if you sow the seed with the grain for the green feed it will get smothered up. Instead of dividing the land into four fields, I would divide it into six, and I would take two crops of hay, two crops of peas, one of grain, and one of corn. You will have two fields that you can put your cattle into day or night, and you can change the pasture weekly, or have one pasture for night and one for day. I prefer to take two crops of hay, for the reason if the first crop is pastured, the tendency is to destroy a large number of roots of the delicate plants. If you cut the hay the first time, and take another crop of hay, and then top dress, you have the very best conditions for pasture, and you will have the best condition for hay for the coming year, and the best condition for pasture for two years.

Mr. Grisdale: We are trying two systems of ventilation, and I would rather not say anything about it for another year. I think just the opposite of what Mr. Macpherson says about the rotation. The more we plow our land and work it the better will be the rotation, and I think if he gets 100 pounds of milk from a four year rotation, he would only get 80 pounds from a six year one, and if he continued it into a three year rotation he would be more likely to get 120 pounds. The shorter the rotation the greater the returns every time. (Hear, hear.) We have had rotations extending from three to six years. The shorter the rotation the greater the returns.

Mr. Macpherson: After the first year it is top-dressed for the pasture, and the second crop of hay taken.

The Chairman: Does not the clover get cut off the land in that way?

Mr. Macpherson: Yes.

Mr. Grisdale: I have seen over and over again where it has taken three and four acres of pasture to carry a cow under these conditions, whereas we can carry two cows per acre. There is one thing I like about Mr. Macpherson's rotation, and that is having all pasture. Mr. Macpherson has had the advantage of living in one of the most fertile spots in Ontario.

A Member: I notice Dr. Rutherford has spoken from a veterinary standpoint, and Prof. Dean from a practical standpoint, and I would like to ask when the professors differ what are we to do?

Dr. Rutherford: The gentlman is partly wrong. It is true that I am speaking from a veterinary standpoint, but I am speaking from a practical veterinary standpoint. (Applause.) As I said in my opening address, if you have one tuberculous animal in a stable that is so improperly ventilated, and it is to be maintained at a temperature of 50 degrees or 60 degrees without artificial heat, the chances are 100 to 1, that every other animal in

that stable will be afflicted with tuberculosis. (Applause.) Prof. Dean said he thought he had no tuberculosis on the farm. I remember when they had. If they had one tuberculous animal in that stable in which he maintains at 55 degrees without artificial heat he would very shortly have a whole lot more.

Prof. RUDDICK: I think I have trouble enough in connection with the line of work in which I am interested. I believe the question of ventilation to be an important one. I am very glad this discussion has taken place, because I fully agree with all that has been said with regard to the importance of stable hygiene or ventilation. I am satisfied that if we had better conditions in the stables at this time of year we would have a better quality of milk, and many of our troubles in the dairy business would be removed. I believe a great deal of milk is spoiled on account of bad ventilation in stables.

Prof. DEAN: I would like to ask Dr. Rutherford why he thinks tuberculosis would multiply or increase in a stable at 55 degrees at a much greater rate than in a stable at 40 degrees.

Dr. RUTHERFORD: That is a very reasonable question. In the same stable, with the same system of ventilation, you have one day a temperature of 55, and the next day a temperature of 40, dependent on the outside weather conditions. I would say that in my opinion the stables which is most frequently filled with fresh air, and has the very best ventilation, would be a stable at 40 degrees, of course depending on the temperature outside. When the temperature gets up above 40 outside we are not troubled about ventilating, because we open the doors and windows. In the northwest, the temperature runs down to thirty and forty degrees below zero, and it is quite a problem to ventilate the stables. A horse standing in the open, requires 100 cubic feet of air per hour. Put him in a stable, and you require to put into that stable about 15,000 cubic feet of air in order to give him his 100 cubic feet of pure air per hour, and his necessary supply of oxygen. If you could have followed me through the stables of England and Scotland you would not wonder at my being a little bit of a crank on a subject of this kind, and more especially if you had gone into the stables of the Icelanders of Winnipeg who were supplying women and children with milk. There we found the stables banked up with manure, every crevice stopped up, and the weather outside 38 or 48 degrees below zero, with the stables from 50 to 70 degrees inside, and 55 per cent. of the cows having tuberculosis. That is the condition in Winnipeg, and that is the reason I am a crank. (Applause.) I do not think there is any doubt there would be very much less risk in a stable at a low temperature than a stable with a temperature of 55 degrees. In spite of all the insinuations, Prof. Dean and I think a great deal of each other, and have mutual respect for each other's opinion.

The CHAIRMAN: I think these last twenty or twenty-five minutes have been the best meeting we have had. I am delighted with the discussion that has taken place. I sleep with my window open and just look at me. (Laughter and applause.) I want ventilation, and I have no sympathy with these people who build expensive barns with 7x8 windows on each side, and shove their cows into what I call a root house with blue mould on the side of the walls, and then expect them to do the best services for them. I would build an "L" shaped barn, wood, lined with paper, and I would have it warm and well ventilated. Some people will buy a thousand dollar cow and shove her into one of these poorly ventilated stables, and then wonder why she is not up to perfection.

COMMITTEES.

The following committees were then appointed:

Business: J. R. Ruddick, John R. Reid, R. B. Faith, R. G. Murphy.

Nominations: J. R. Dargavel, M.P.P., Edward Kidd, James Whitton.

Legislation: D. Derbyshire, M.P., John R. Dargavel, M.P.P., Henry Glendinning, G. G. Publow.

Resolutions: R. G. Murphy, John R. Reid, L. Patton, T. B Carlaw.

ADDRESS TO THE GOVERNOR-GENERAL.

His Excellency, the Governor-General, was to have been present at the evening session, but, owing to illness, he was unable to attend. He was represented, however, by his Military Secretary, Hon. Colonel Hanbury-Williams. There was a large attendance, and a splendid musical programme was rendered during the evening.

The CHAIRMAN: We regret exceedingly that we have just got word from the Governor that he is ill in bed, but he has sent in his stead, his Military Secretary, the Hon. Col. Hanbury-Williams, who is here on the plantform, to convey his wishes to this Association. We regret that the Governor is ill, but we are glad that Colonel Hanbury-Williams has honored us with his presence here to-night, and will convey our wishes to the Governor-General as expressed in the following address:

To His Excellency, the Right Honorable Earl Grey, Governor-General of the Dominion of Canada:

May it please Your Excellency. We, the officers and members of the Eastern Ontario Dairymen's Association, desire to express to you our hearty appreciation of the great honor you have conferred upon us by consenting to open this, the first Dairymen's Convention held in the capital city of Canada since you came amongst us as Governor-General of the country, of which we are all so proud and love so dearly. We appreciate the honor you are conferring up us.

We feel much gratified that an English nobleman of high rank and position, and the bearer of a name so well known in the history of theMotherland, should be willing to devote his talents and energies to the service of our Dominion, and thus to add one more strand to that unbreakable cord of love and gratitude which binds us to the old land across the ocean. As dairymen and citizens of this fair Dominion, we attest our loyalty and devotion to the Empire and to the person of His Gracious Majesty, King Edward VII., and to you, his representative.

We have noticed with much pleasure the great interest you have taken in all that concerns the welfare of Canada, and we are glad, indeed, to have you brought into close contact with the men who are engaged in what we believe to be the greatest industry in our country.

This Association is endeavoring to further the success of this important industry, by the holding of conventions and local dairy meetings, at which, addresses are delivered by experts, discussion encouraged and means devised, by which we may be able to maintain the proud position we now hold, in supplying the British market with the largest share of her imported dairy products.

Again, allow us to say, that we appreciate your kindness in thus being present, and our sincere desire is that your Excellency will become an Honorary Member of our Association.

We all, most sincerely wish Your Excellency the compliments of the season, and trust that your stay in Canada will extend over many more years, and that they may be fraught with much happiness. On behalf of the Associations,

D. Derbyshire, President.
R. G. Murphy, Secretary.

I beg you to present this to His Excellency, the Governor-General, with the kindest regards of this Association, and at the same time, request him to become an Honorary Member of the Association, and present him with the badge I have already furnished you.

Colonel Hanbury-Williams: I regret extremely, that His Excellency is unable to be here to-night, but he was laid up this morning with a feverish attack of cold, and it is quite impossible for him to come, and he has asked me to convey to you and the Association, his best wishes for its success. He is well aware of the work that it is doing, and it is a work, in which he takes the greatest possible interest. He hopes that at your next meeting he will personally be able to be with you. I, as Military Secretary, have a great many and various duties to perform in Canada. I have among other things, to bow thirteen times at each meeting of Parliament, and the other night, I had to perform at theatricals as a ghost. Well, to-night, I am the ghost of His Excellency. (Laughter and applause.) I should have been only too glad as his ghost, to have made you the excellent speech which I know he would have made if he had been present. Unfortunately, His Excellency forgot, when he sent me to act this part, to provide me with what we call in theatrical parlance, a "Book of the Words." Therefore, I have no book of the words to read to you, but I do convey to you most heartily, his sincerest wishes for your success. (Applause.)

COW-TESTING A DAIRY REQUISITE.

By Hon. Sydney Fisher, Minister of Agriculture, Ottawa.

After expressing regret at the absence through illness of Earl Grey, and complimenting the Association upon the fact that its President was a member of the House of Commons, now in session at Ottawa, the speaker proceeded to say:

You are here to discuss dairy problems, and I would like to say a few words to you in regard to these subjects. I have always maintained that wherever dairying is the basis and the chief factor in agriculture, there you will find prosperity. (Applause.)

One of the most excellent examples of the agricultural progress to-day is the little country of Denmark, and if you look into other countries like Switzerland and Sweden, and the New England States, and the great States of New York and Wisconsin, where the dairying industry is carried to the highest perfection in the Union, you will find these States the most prosperous, and their prosperity is the most sure, the most constant, and best founded of any industry.

Under these circumstances, I need not enlarge on the value of dairying to the people and to the country. The fact that we exported last year nearly fifty million dollars worth of dairy products and bacon, which are subsidiary to the dairy products, and that in Canada altogether the production of dairy and allied products came to over $100,000,000, ought to be very convincing. In addition to the great prosperity and material advantage of dairying, there is a greater advantage in its being the highest development of the agricultural character of the people. There is no branch of agricultural industry in which skill and intelligence is so absolutely and to such a great extent required; therefore, I believe it to be one reason that the dairymen of Canada are the most intelligent farmers of Canada. Farming in its crude sense is somewhat of a drudgery. I say frankly that a man cannot be a good farmer in Canada unless he is a worker, and I am proud of the fact, because I am also glad to know that the Canadian people as a people are workers, and the more they are workers the better men they are.

I want the farmers of this country to be workers with their brains and intelligence more than workers with their hands, and if he can use his brains and his intelligence effectively and well, the work of his hands will be better, and he will be more skilful with his fingers, and the better handicrafts man, and the better citizen. A few years ago a simple mechanical test was found for gauging the richness of milk. I allude to the Babcock test. The discovery of that test revolutionized dairying, because by that test we are able to immediately find out the quality of what we are producing. We are not content to-day to know how many pounds of milk our cows produce, we are not content to-day to divide our profits at the factories simply by the number of pounds that the man brings in, but we want to know if it contains all the milk that our cows produce, and we want to know how much butter fat the man brings to our factory. I daresay some of you will know that I am not speaking of every factory in the land, because I regret to say that there are a great many of our factories that do not yet pay by the test.

I want to say a few words regarding what we call cow-testing. I consider this, not a discovery or invention, as was that of Dr. Babcock, but it is a practical application of just the same kind of work and thought that brought about the discovery of the Babcock test. The Babcock test came to us from the Western States of America, and the cow-census also came to us from the Western States of America. The idea was given to our dairy world by our old and dear friend, Ex-Governor Hoard, of Wisconsin, who instituted a cow-census among the factories of Wisconsin many years ago, and the result has been an increase of dollars and cents in his pocket. He tried to find out why it was that some men sent in 4,000 or 5,000 pounds of milk per cow, and other men only sent in 2,000 or 3,000 pounds of milk, and how it was that some cows he knew were supplying to his factory 8,000 to 10,000 pounds of milk in a season, and other cows with nearly the same treatment were only delivering to his factory 3,000 to 4,000 pounds of milk in the year. He got his patrons to investigate their individual cows. He began by investigating herds. In many instances it was found that certain animals were giving double what other animals were giving under the same treatment, in the same stables, the same pasture and the same management. The result has been an enormous increase in the annual production per head in the cows of that state. What we require in Canada is that all the cows that are kept by our farmers should be increased from 25 to 50 per cent. in their annual production of milk.

We were shown this morning that we exported last year over $30,000,000 worth of butter and cheese, and that in Canada we consume probably $55,-

000,000 worth of milk, butter and cheese, and I venture to say that at the very least, 25 per cent. can be added to that production within three years, if cow testing associations were general all over dairy districts of the Dominion. (Hear, hear.) That would mean that our dairymen would have, instead of $80,000,000 worth of milk, butter and cheese, over $100,000,000 worth.

There is no doubt a vast improvement can be made by scientific breeding and selection of our dairy stock, and the other side of the question is actual care in the management of the cattle. I am a dairyman myself, and a few years ago I was fortunate enough to be home for a few years without any distraction of political and other inferior life, (applause and laughter), and I was able to attend to my dairy alone. I had a herd of about twenty cows, and after two or three years testing of the individual cows, in the year before I became Minister of Agriculture, my herd produced three hundred odd pounds of butter for each cow. This is nothing very great. I do not boast of it in any way; it was a good fair yield. I joined the cow testing association in Cowansville and the Eastern Townships this last season. I asked my foreman to test the cows under the rules of that cow-testing association. It is ten years since I looked after them myself. Ten years since my cows made over 300 pounds of butter in the year. This year, according to the test, they averaged in nine months a little under 175 pounds of butter fat, or less than 200 pounds of butter in the year. That is to say, after ten years of disregard of testing, with the same class of animals, they have gone down from 300 to 200 pounds of butter in the year. They are nearly all thoroughbreds; they are just as good individually as my animals were ten years ago. Some of the thoroughbreds are at the head of the list, and some of them are at the foot of the list, and I would like to say that while thoroughbreds are, *prima facie*, likely to be better workers than the grade animals, the fact that the animal is registered as thoroughbred is no conclusive proof that it is a good working dairy cow. I speak with regard to all the breeds. I believe it is just as necessary that we should have this work, which is now being started in Canada, under the auspices of the various thoroughbred associations for what is called advanced registry of thoroughbred and registered animals, as it is for us to have cow-testing associations which will deal with all individuals whatever may be their breed. Well bred, well chosen thoroughbred stock must be the foundation of our stock, but to accept individuals which happen to register without examination of their performance and without thoroughly considering other facts and using these animals to be the basis of our dairy herds, is a great mistake. I know that thoroughbred sires of well chosen dairy breeds, and well chosen individual sires, are absolutely necessary for the improvement of the dairy stock, but to select the thoroughbred sire without knowing anything about the performance of his fore-bears, or about him in his individual character, is simply folly, and you might almost just as well take a scrub. At the present time, we have sixteen cow-testing associations in Canada, and I want to tell you, gentlemen of Ontario, that thirteen of these are in Quebec, and it behoves the Ontario men to look to their laurels, or the Quebec men will get ahead of you, as they have already got ahead of you in butter production. I hope to see thirty cow-testing associations in Ontario in the near future. I am satisfied it is one of the most important features for the improvement of dairying.

Intensive cultivation of the soil in this country is extremely lacking, and I believe intensive working of the cows in this country is also extremely

lacking, and if you are going to increase the dairy products and swell these magnificent figures higher and higher, cow-testing is the most profitable, the most intelligent, and most skilful way in which to do it.

I regret that I was unable to be present throughout all the discussions of to-day. I hope to-morrow to be able to attend your meeting, and if I am not present it will be because my duties in the House of Commons absolutely require my services. (Applause.)

The PRESIDENT: I am sure we are delighted with the inspiring address of our Minister of Agriculture, and I am sure he will look after us even better in 1907 than he did in 1906. He gave us better transportation and better facilities for getting our goods to the British market, and in giving us these cow-testing associations, he has made a good step in advance. Quebec can never beat Ontario; don't worry about that. They can never do it in the world. (Great applause.)

Mr. D'Arcy Scott, Mayor-elect, was introduced, and cordially welcomed the association to Ottawa.

CONTRIBUTORS TO DAIRY ADVANCEMENT.

By G. C. CREELMAN, President Ontario Agricultural College, Guelph.

I appreciate to the fullest extent the invitation which has been again extended to me to again come here, not as a professor, because I have nothing to profess, and not as President of the Agricultural College altogether, but as a member of the Eastern Dairymen's Association. I thank the President and Directors for inviting me for the fifth time to address this Association. How you have grown. It is not so long ago that you could drive almost all day between cheese factories in Eastern Ontario, and to-day there are places in Ontario, where in a ten-mile drive, you will pass from ten to twelve factories, and your product in the British market leads the way. (Applause.)

I congratulate the dairymen of this Eastern Association in the matter of improved products, and in the improvement of your individual factories. As I go from county to county and township to township, and go into these factories and see the improvement that has been made upon them, I can realize that great work has been done by this Association. I congratulate you because you realize now that the business of dairying, the business of cheese-making, and the business of butter-making is a profession in itself in which there is just as much to be learned from day to day, and from year to year, and just as much opportunity for the development of the grey matter in your heads as in any of the so-called higher professions. This has not been brought about during a life time, but within the last few years, even during your term of office, Mr. President, and because of this increase in the dairy business there has been great increase in land values in Eastern Ontario, quite a great increase in the prosperity of the farmers of this country. I can remember, however, that when you first took the chair you made a statement that you believed so sincerely in the future that you believed the time would come when land down in your county which was then worth $10, $11, and $12 per acre in many places would be worth $25 an acre. I would hate to-night to offer the first farmer I met less than $50 or $75 an acre for the same land on which in those days they were endeavoring to produce crops, for under the rule of the cow that land has doubled and trebled and quadrupled in value, and this Association has to be congratulated to the fullest extent for the part which they have taken in bringing about this result.

I would like to mention the names of five men, yet living, and yet active in the work, who along with many others whom I have not time to mention, have contributed, in my opinion, most to this great movement. These men are yet living, and before we come to write their names upon the tombstones, and stand and read good things about them, and take up the newspapers and magazines and read about the good things they have done, I think that we can give them full measure of praise while they are living. The names I would like to mention are:—Sydney Fisher, J. W. Robertson, John Dryden, Nelson Monteith, and J. A. Ruddick. (Applause.) The farmers have done their part. You know your factory and you know your creamery, and these representative people in Parliament, in the Local Legislature, and at Farmers' Institute meetings. In season and out of season, these men have stood to the front, and have dignified the profession of agriculture and the profession of dairying, and it is my pleasant duty to single out of these five men and mention them here to-night. (Applause.)

Another point that occurs to me that has assisted in this general prosperity, is our dairy schools. The Eastern School at Kingston has done a lot of good in Eastern Ontario. When Mr. Ruddick undertook the management of that school, under the direction of the Ontario Department of Agriculture, and with the sympathy of the Board of Directors of this Association, some people in this part of Ontario said, "What can a young man like that come and tell us? What can he, with a staff of young fellows, tell us about making butter and cheese?" He had the active sympathy of the members of this Board, and the school was a success. The men who are going to succeed in this business ought to attend two or more sessions.

Another thing which has contributed greatly to the dairy industry in this country was the McKinley tariff. You remember how you cursed that tariff when it was first brought out, and how the politicians said the country was ruined. We said the McKinley tariff was going to be a curse to this country, and our farmers would have to go out of business; but their superior intelligence and industry and that peculiar breeding which belongs to the average Canadian turned to another direction, and approached the great markets of the British Empire, with the result that you already know. (Applause.)

When McKinley made 60c. wheat, the people said, "We are ruined." For two or three years, the mortgages increased, interest rates were high, and quite a few moved off to the United States because they believed there was no future for them in this country. Under these adverse conditions our farmers turned from grain to dairying which was the agricultural salvation of this eastern part of Ontario. (Applause.)

The people of the United States appreciate the young men from the farm for three things: 1st, their general intelligence and the quickness with which they adapt themselves to new conditions; 2nd, their untiring industry, having been used to hard work always on the farm at home; and 3rd, for their superior morals in the general way of taking care of themselves and not being given to frivolity or any kind of intemperance. So long as our young men on the Canadian farms are industrious, and so long as they have the integrity and intelligence in business that they have shown in the past, I think we have no fear for the future as to farm conditions and the dairy industry in this eastern part of Ontario.

What about the future? It is well enough for me to stand here and talk in an optimistic mood in this way, and say "We are the people, and wisdom will die with us." What of the future? Have we got to the end of our tether, and are we ready to sit down and ask the Supreme Being to say to

us, "Well done, good and faithful servant, enter thou into the joy of thy Lord?" or shall we say, "We have been faithful over a few things, now make us ruler over a great many things, that we may bring the dairy business up to what it might be." I am not much at quoting scripture, but I think I can go one more, and say that it may be that the finger is pointing at us and saying to us, "Go out into the world and preach the gospel of good dairying to all the people."

As you are especially a dairy convention, may I be permitted to point out two or three things that in my opinion the cheese-maker and the butter-maker at the present time have to watch very carefully, if they are going to continue to make good cheese and butter, because the people on the other side of the line, and on the other side of the water, are watching us. Hardly a week goes by that I do not get letters from the Old Country or the United States, asking if I could not recommend a young man from the Eastern or Western Dairy School. (Applause.) So they are after us, and we have got to go on and improve and make better butter and better cheese. We have got to bring it up to the highest standard, if we are going to retain the lead. There are, perhaps, many successful men in this world who do not read very much, but the day has gone by, when the cheese-maker can afford not to be a reading man; he has got to fall behind in the race unless he keeps himself up in principles of dairying.

The Canadian Dairyman is the only paper especially devoted to dairying in Canada. It now comes out in a new form; it is edited by one of your Eastern men, Mr. H. B. Cowan. (Applause.) I am not advertising the management, or getting paid for it, but it is the only dairy paper in the Province of Ontario, and there is no reason why every cheese-maker and every man engaged in the dairy business, should not have this paper in his home. There are other agricultural papers that are good, but I feel obliged to say this word in favor of this new paper. A man must not only read, but he must become a close observer. If you are not a close observer, your reading will become pure theory. The practical up-to-date dairyman must also experiment. It is for you who have the situation in your own hands to try to do things and observe them in your factory. Try them, even if you spoil a horn occasionally in trying to make a spoon. I would like the word "experiment" to become a common word on our farms. I want you to realize how you could conduct your own experiments. In the month of June last year, I passed through what we call the experimental fields on the Farm at Guelph, and I noticed a beautiful field of barley, as even as any field I ever saw. Every head seemed to be just about as high as every other head, and as the gentle breeze touched it, it was just a little wave, and looked like a perfect field of grain, and the whole field came up to just as you intended it to be. I remarked to Mr. Buchanan, "Why is that piece of barley so much more even than the other"? and he said, "I am glad you asked me that question, because you have noticed it, it will be noticed by other people. We have demonstrated by experiment that if we take the large grains and the sound grains from a bushel of wheat, and plant them by themselves, we will get a larger and better and stronger crop than if we plant them just as we bring them from the granary. We have gone further, and that field of barley came from one grain of barley two years ago. Two years ago we planted one grain of barley, and from that we got one thousand and forty grains. We took out forty or fifty grains and planted the rest, and we got two bushels from that. We took out one-half gallon and sowed the rest, and this field of barley is the result, and he said "I expect that

field will give me ten bushel per acre more than ordinary good seed. That work could be done in one evening by any farmer, by picking out the best seeds." And I said "That is pretty good business."

The same with strawberry culture. They are having wonderful results by selecting the best plants.

Prof. Dean spoke of one cow of the herd that produced over 11,000 pounds of milk, and another cow in the same herd, and that is not a mean herd, produced over 4,000 pounds, and the average of the Province of Ontario is only 3,000 pounds, and I leave it with you just as a problem to be worked out. Is it not the duty of the farmers of the Province of Ontario to drive that stigma away from us, and by these cow-testing associations raise the standard of our cows just a little higher, and get the average production of the Province of Ontario a great deal higher than it is. (Applause.)

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

You have been having such a feast of reason, that it is almost a pity that a plain country chap should worry you to-night. When your President invited me to be present with you at your convention in Ottawa, I felt it a privilege, an honor, and a duty to come among you and see what you were doing in the Eastern end of the Province. It has not been my good fortune to mingle with the men of the eastern portion of the Province as much as I have with the men of the West. However, I have always found that the dairymen of Eastern Ontario generally had a fair idea of what they wanted when they came up to discuss matters of finance at Toronto. They had their plans fairly well digested before they brought them before us, and their demands were fairly moderate. I trust the good fortune that has fallen upon the people of Ontario in the Northern portion of it, will not make your demands too exacting in the future.

We are here to-night in this beautiful city of Ottawa, the capital of the Dominion, which we, as Canadians are justly proud of. We are proud of your prosperity, and that you have set about to make this the most beautiful city in Canada. You have great ambition, and I hope you will not get weary in well doing along that line.

I am not a man of words, but I have attempted to be a man of action, whether on the farm, or in public service. We have here with us to-night, a fair representation of the leaders of agriculture in Eastern Ontario. I see a great many men here, whose heads are beginning to show the tint of age, and also a great many young men in the vigor of life, and with the courage and boldness of youth. We have much to learn from the older men; they have had the duty upon them of being pioneers. Alas, two few of those who bore the strenuous trials of the early pioneer life, remain with us, but we have men of middle age who know the trials of agriculture in this great Province of Ontario. We do not know what difficulties are to-day, as compared with the difficulties under which they labored. Nevertheless we have a struggle in the keen competition that is abroad throughout the whole world, and we have to bring this great heritage that has been left us by those who preceded, to that standard of nationhood and citizenship, in order that our influence may exist far beyond the borders of the land we so dearly love. We who have had the good fortune to be born and reared in a climate whose vigors demand a struggle for existence have in our make-up those elements that have ever ruled the world physically and mentally.

Take if you like, the countries of Europe, and I believe we bid fair to demonstrate that same truth on the continent of America. With all due respect to our American cousins to the south of us, I trust that we will hold stronger to the virtues of humanity than possible they have in many lines. We have here, in the Province of Ontario, fine resources, not limited to agriculture alone, but in mines and forests, the latter of which you at Ottawa have such intimate knowledge. In days gone by, your forests were the pride of Canada, I may say, almost of the British Empire, the forests of the Ottawa Valley. They have been vanquished to a great extent, and we are now more and more dependent on their inexhaustible supply of fertility that lies within the bounds of our agricultural area.

I believe I speak a word of some prophecy, when I say that the time will come when, instead of our speaking of Ontario East and West, we may speak of it North and South, because the Northlands are being peopled rapidly, and we have there a vast area of agricultural lands, and in the not distant future, these lands will be the home of millions, and that is not a dream. We as Canadians having a desire to make this great Dominion what we believe it was destined to be, have a great duty devolving upon us, to see to it that the great connecting link of Northern Ontario be filled with people to bind the west and the east in common interest, and I believe it is through the development of agriculture that that must be brought about. While many of our young men are turning their faces to the west, I believe that they will find plenty for their ambitions that will amply reward them for their endeavor in Northern Ontario.

It has been my good fortune to have been reared on a farm, and to be in close and sympathetic touch with the conditions of farm life, and my sympathy goes out to the men and women who make up our rural populations, more especially so when I see them gathered under comfortable conditions such as I see here to-night. I regret that the great mass of the people cannot be reached in this way for instance, the man on the back concession whose surroundings may be humble. I regret that we cannot bring the truths that have been so well spoken here home to him, in order that he may take new inspiration, and feel that after all, life is not merely a struggle with no object in view. I spoke to your instructors upon that subject a year or two ago. I feel that one of the greatest missions the instructors had, was not only to instruct the cheese-maker how to make cheese and butter, but to go out among the farmers, and meet them in their own homes, talk with them and make them feel that after all they were part of this great co-operation upon which we are all so dependent. Teach them that after all "No man liveth to himself," that we are all interested in this great dairy industry, that it must work smoothly, and that the products of this country, this Canada of ours, may attain a higher degree of perfection than they have yet attained.

The inspiration of such men as have addressed you here to-day on the technique of the dairy industry, helps us on. The great masses do not read what is in our press, and what is disseminated through our agricultural journals, and all these are mighty factors in the education of this nation. There are a great many farmers who are merely existing in their homes; they take no interest in reading of the affairs of the country and keeping in touch with the events that are transpiring around them. These are the men that the instructors should aim to reach, and try to raise them to a higher standard of citizenship.

I might speak at some length of what we are trying to do in Toronto through the staff of instructors and professors. We are not forgetful that

"Money makes the mare go," as the saying is. We believe that money can be judiciously spent in extending this great business, but I hope that it may never come when money may be given by the Government for the sake of giving. I feel that so long as money can be given to advance this cause, the money will be given gladly and freely. We are proud of the men engaged in this business; they have shown loyalty to our Department. I know the difficulties that they are up against, but I believe as time goes on they will be better appreciated by the people. I hope that your convention will be well attended, and that the knowledge and interest that they manifested to-day will be maintained to the end, and that you will all go home profited by coming together at this splendid convention.

The CHAIRMAN: Our good friend, the Minister of Agriculture, gave us twenty-eight instructors this year; two Sanitary Inspectors, and our Chief Inspector, Mr. Publow. We feel proud of him for doing these things, and while we had 740 factories out of 1,000 under the management of these men, next year we expect that he will give a few more instructors, and make these all Sanitary Inspectors, so that we can make all these factories come in. Every man that is a maker of cheese has got to come into this syndicate some day; and we will have these inspectors not only help the factories but help the farmers as well. Our good friend, the Hon. Mr. Fisher, has given us better transportation facilities, and that is one reason why we got better prices than the year before; because our goods were delivered in better condition. It is our business to keep them guessing for 1907, and we will do it.

I would like to have our old friend Dr. Mills pronounce the benediction before we close. (Laughter and applause.)

Dr. MILLS, Ex-President Ontario Agricultural College: I need scarcely say that I am gratified to see Mr. Derbyshire still in the chair he has occupied so long with so much enthusiasm and ability. I have listened with much interest to what has been said by the Ministers of Agriculture, the Chairman, and the President of the College. I have felt for a good while that you have attained considerable degree of success in the way of instructing dairymen how to make butter and cheese, and in the caring and handling the goods after they are made. I think you have done well along this line, and I feel disposed to say what I think on another line. I do not think you are doing what you should towards reaching and improving the source of production. You may do what you will in the way of instructing men to care milk and cream after it reaches the factory, but if the people who supply the milk are not up to the standard then you will never have the very best article. If your milk is contaminated by filth and dirt, by disease producing bacteria from the stables before it reaches the factories, the most experienced men can never make the highest class of goods. I know what I am talking about; and I say it is a most serious thing that this matter has not been looked into, and I think it is a great pity that you are not reaching out and getting hold of the men that are supplying the milk to the factories. In Denmark every man that sells milk has to submit to the closest possible inspection of his premises. We ought to have that inspection in this country for the health of the grown people and the children. (Applause.) I think that you should add that to your cow-testing. I agree that they should do as the Minister said on the importance of testing cows and sending to the butcher those that do not pay their way. (Applause.)

The CHAIRMAN: That was a wise stroke to ask him to come up. You know that I knew what was in his head. We are going to have more inspectors, and factories will be sanitarily inspected. We are going into every factory and farm, and make them clean up or shut up. (Applause.)

HIGH CLASS DAIRYING.

By G. A. Putnam, Director of Dairy Instruction, Toronto.

It gives me a great deal of pleasure, indeed, to come before the Dairymen of Eastern Ontario, because when I come before the dairymen, I come before the representatives of the largest industry, by far, along agricultural lines. I have wondered what Eastern Ontario would be were it not for the Dairy Industry. This was referred to yesterday by President Creelman. He stated that land values had been doubled, tripled, and quadrupled as a result of the introduction of dairying.

I wish first to say a few words as to the work of the Department of Agriculture of Ontario. Many of you possibly are not aware of the efforts that are being put forth by the Department and the money which is being expended, irrespective of the work which is being done at the Agricultural College, where they spend a good deal of money, and do a lot of most effective work that is of great benefit to the dairymen of the Province. In addition to that, the Provincial Department spend something like $51,000 directly in the interests of the dairymen of the Province.

Mr. Barr is chief dairy instructor in the West, and he is also Superintendent of the Dairy School and Secretary of the Association, and I am sorry he is not here to tell you of the conditions in the West. The factorymen in the West are in somewhat better position than the factorymen in the East, for the reason that the factories are larger, and the individual dairymen in the West keeps a larger number of cows.

I was very pleased last night to hear Dr. Mills, whom I look upon as my father instructor in agriculture, state that the chief work to be done in connection with the dairy business is to do something effective by way of inducing the producers of milk to deliver to the factories clean milk, properly cooled.

The Women's Institutes of Ontario now comprise 400 organizations with a membership of nearly 11,000, and they are doing an excellent work in building up the home conditions of this country. When we have the mothers and daughters consulting together as to what they can do to make the homes on the farm more attractive, we will have improved conditions, and the boys and girls will be induced to remain on the farm. When we have 400 organizations making for one definite object, we can rest assured that it is bound to tell on the future of this country. At the Women's Institute Convention, held in Guelph in December, one session was devoted to the subject of milk, and Professor Dean gave a most excellent address on the production of milk, Miss Shuttleworth on the care of milk, and Dr. Helen MacMurchy spoke from a doctor's stand-point. Dr. MacMurchy stated that an infant raised upon the average milk which you get in the city has one chance out of fifteen to reach maturity, as compared with an infant which is raised in the natural way by suckling its mother. This is due largely to the lack of care in the handling of milk and neglect of properly cooling it. This shows the danger which infants are subject to in drinking milk which is sold in the average city of the Province. I think it is high time that some Government regulations were adopted by which the supply of milk should be inspected, as well as the farms on which it is produced.

We hear a great deal as to the lack of care in handling milk, by the producer. We accuse the farmers of being uncleanly in their methods. But there is another side to the story. We all know that it is very difficult to

get efficient labor upon the farm, and farmers work a great many more hours than the average city man, and my sympathy goes out to them. I admit that they do follow rather uncleanly methods, but it is difficult for them to adopt what we would call cleanly methods in the production of milk. Many of them do not realize what cleanliness means so far as dairying is concerned, and many of those who do have had no time to put the advanced methods into practice; a few on the other hand, have no inclination to put into practice the knowledge which they have. If you say to the average men from the farm "Why don't you take off that coat and the trousers which you have been working in all day, put on clean outer garments and wash your hands before you start to milk the cows"? he would laugh at you and likely reply, "I have to wash after I get through; what is use of washing now"?

I trust that we may be able to so arrange the instruction work this year that every farmer will be visited, not with the object of demanding that the farmers do this and that, but to reason with them and to show them that it would be a monetary gain to them to take proper care of their milk; that they would get an increased yield of cheese, which would more than repay them for the increased work which they find necessary in adopting these cleanly methods, and after all it would not require much additional work on the part of the farmers.

We do not recommend what might be termed extreme methods such as are adopted in some of the larger dairies where milk is produced for a special trade. What we require is only ordinary care and cleanliness in methods. May I refer to a firm near Toronto, which is now selling milk produced upon their own farm, and which is put up in a special form. The stables where this milk is procured, are swept out carefully every day, the cows are well groomed, the food is brought in from another building. The walls are mostly of glass, and there is provision for abundance of fresh air and light. That milk is sold for 12c. a quart, and they have no difficulty in selling all they can produce. Why do not some of our factories and creameries aim to produce a superior article for a fancy trade?

Last year the instructors were furnished with sheets upon which were printed some instructions as to the care of milk, the care of the cattle and utensils, and the necessity for keeping the milk clean and cool. If we can get the farmers of this Province to take the care that is necessary in producing milk, many of the troubles which we hear so much of, would disappear. If we could go to Prince Edward County and visit the farms where they are taking good care of their milk, and where they have put up special milk houses, I do not think you would hear much complaining on the part of proprietors and makers. For many years past we have spent money upon the work of instruction, and the instructors have done their work faithfully and well, and we have been gaining ground. Still there are 275 factories that have not yet been brought into the fold, and it appears to me that it will take some years along the old lines to get many of these factories to come into a syndicate for instruction, and there are a number of them which you will never get. Small factorymen, and the factoryman who does not realize the necessity for up-to-date methods, you will never get; and if you do not get him, how are you going to be assured that the average quality of the cheese shipped from the country will be raised?

I trust your Association will make a strong representation to the Department, recommending some method by which these factories can be brought under instruction work. I feel sure that if they were charged $50 a factory next year and the following year, that the benefit accruing to the

dairymen of this country, by having all the cheese brought up to a certain standard, would more than repay each for the money they had been asked to pay for instruction. We must get at these factories which are away down low in the scale.

The CHAIRMAN: Mr. Putnam did not know I was going to call on him, but he did well. I put him right up here without having any notice, and he has made a nice up-to-date address. It does seem to me that I would produce that 12c milk. We sell milk in Brockville for 5 and 6c a quart, and I believe I could get 400 customers that would give 12c. if they could get it from an absolutely clean stable, and if they could get milk that was absolutely pure, from healthy animals that were kept clean and healthy, and given pure water to drink. If you could get absolutely an advanced quality of milk you could sell it at any price you might like to ask. Customers in New York City to-day, go out in the country and look over the herds themselves, and make their bargain for the milk, and they are ready to pay twice what the ordinary man asks for his milk. We have had the assistance and co-operation of Mr. Putnam, throughout the year. He has aided us in every possible way, and we feel proud of the work he has done, and we feel proud of the work Mr. Publow has done. He has had an able staff of twenty-eight Instructors, and two Sanitary Inspectors under him, who have been doing efficient work. There is going to be no guessing about what is done in 1907. We are going to raise the standard of the quality of our cheese. If you have a little factory sticking in the mud, it hinders every other factory in the country. Another thing, that I lose my temper over is when I see cheesemakers trying to struggle with the milk when it is impossible to make fine stuff. It is not fair, it is not honest, and I tell you we want the men on the farm to have some of this responsibility. Next year, we are going to have as many more Instructors as the Minister of Agriculture for this Province will give us. We are going to have more; we know that now. (Applause.) We are going to have these men go from factory to factory and farm to farm, and talk in a nice way to these people, and show them their responsibility, and we are going to have everything connected in one solid chain. If you have one weak link the whole chain is no good; we must have all working together for the best interest of this industry, and raise the standard higher this year than it has ever been in the history of the world.

DAIRY INSPECTION.

By G. G. PUBLOW, CHIEF DAIRY INSPECTOR, KINGSTON.

It is with pleasure that I present to you my fourth annual report as Chief Dairy Instructor for Eastern Ontario.

The work of instruction was carried on in a similar manner to the methods followed in the previous year, and so the general outline of my report cannot be changed very much.

Owing to the fact that is is optional with the factorymen whether they employ an instructor or not, a circular letter and application form had to be sent to each one some time before the manufacturing season opened. Seven hundred and twenty-seven of those who made application were given the service of an instructor, but a great many have failed to send in their applications until all the territory had been divided, and consequently they could not be placed in any of the groups. This system of applying for in

struction is a very great drawback to me in arranging my work i the spring, as I never can tell just how many want an instructor, nor can I tell just how many instructors I will require. I would, then, like to suggest, that when the Department is arranging the work of the coming season, they would make some provision that would make it definitely known to me just how many factories we would have to reach. If this were done we would have more time for the selection of the men, and the territory could be more carefully divided, so that some of the instructors could visit a larger number of factories.

The 727 factories regularly visited was an increase of 77 from the year before. To reach these, two more instructors had to be engaged, making a total of twenty-eight.

The new sections were covered by the Vankleek Hill group under charge of Mr. Claude Ferguson, and the Plantagenet group under Mr. Joseph Charbonneau. Our best instructors seem to be the men to whom a great many of the new openings in the dairy work are being offered, and every spring some of our instructors leave the road to accept more lucrative positions.

It was with regret last spring when we were asked to accept the resignations of Instructors Thompson, Echlin, and Publow, who had received these offers.

The positions made vacant by these resignations were filled by Messrs. Herity, Gardner, and Brintnell, all of whom did good work; but I would like to recommend that a substantial increase of salary be given our instructors, for it is very important that we should keep our best and most experienced men in the work of instruction.

As has been the custom, the instructors spent a ten day course of instruction at the Kingston Dairy School before starting their work, and before they left the school, most of the territory was divided into their respective groups.

Rather than individualize the work done in each syndicate, I have prepared a statement which gives the names of the factories in each group, together with a summary of the work accomplished by each instructor.

ALEXANDRIA SYNDICATE: A. McDonell, Instructor.

Union, Central, Glengarry, Aberdeen, Glen Robertson, Beaver Creek, Lorne, Dornie, Greenfield Union, Dominionville, Highland Chief, Heather Bloom, Fairview, General Roberts, Balmoral, Apple Hill No. 1, Apple Hill No. 2, H. L. 155, M. No. 1, M. No. 3, M. No. 6, M. No. 7, H. No. 47.

AIMONTE SYNDICATE: W. J. Ragsdale, Instructor.

Old Fairfield, Lone Star, Rideau Ferry, Rideau Queen, Mississippi Pride, Rosedale, Rosebank, Maple Valley, Appleton, Huntley Centre, Elm Dale, Rockspring, Pakenham, Roseville, Mayberry, Twin Elm, Montague Centre, Valley Queen, Black's Corners, Ashton Union, Island Queen, Crystal Springs, Irish Creek, Maple Leaf.

BANCROFT SYNDICATE: Jas. Irwin, Instructor.

Walkerville, Ormsby, Limerick, Cashel, The Ridge, Chandos, Faraday, Lake View, Mayo and Carlew, Combermere, Beechmount, McClure, Greenview, Hybla, Bronson, Frazer Creek, Mayo and Raglan, Bangor.

BELLEVILLE SYNDICATE: H. Howey, Instructor.

Union, Foxboro, Eclipse, Melrose, Thurlow, Shannonville, Bayside, Sidney, Hallaway, Ketcheson, Bronk, Colborne, Zion, Silver Spring, Cedar Creek, Edville, Salem, King, Wicklow, Castleton, Rogers, Grafton, York, Brighton, Frankford, Mountain, Sidney Town Hall.

BROCKVILLE E. SYNDICATE: A. H. Wilson, Instructor.

Union Valley, Stanley, Star, Barlow, Palace, Glen Elb, Aberdeen, Leeds County, Miller's No. 2, Roebuck, Algonquin, Greenbush, Farmer's Choice, Oak Leaf, Union, Mount Zion, Garretton, North Augusta, Maple Grange, Willow, Maitland Union, Lee Hill, Minto, Farmersville, Glen Buell.

BROCKVILLE N. SYNDICATE: P. Nolan, Instructor.

Lake Opinicon, Salem, Black Lake, Green's 972, Farmer's Friend, Smith's Valley, Reliable, Dominion, Centreville, Seeley's Bay, Fermoy, Ideal, Plum Hollow, Elgin Model, Newbliss, Farmer's Pride, Cedar Bridge, Spring Vale, Willow No. 2, Island City No. 1, Island City No. 2, Crosby, Grand Central, Morton, Maple Grove, Lyndhurst, Cold Glen, Forfar, Clear Lake, Gilt Edge, Bush Model, Rockdale, Portland.

BROCKVILLE W. SYNDICATE: S. S. Cheetham, Instructor.

Morning Star, Thousand Island, Howe Island, Granite Hill, Jackson, Wilson, Maple Leaf, Central, Anglin, Pine Grove, Taylor, Springfield, Gem, Clover Hill, Woodburn, Gananoque Junction, Gananoque, Marble Rock, Lorne, Wilstead, Colebrook, Sand Bay, Long Point, Lansdowne, Tilley, Rockport, Springfield Union, Junetown, Caintown, Home.

CAMPBELLFORD SYNDICATE: R. T. Gray, Instructor.

Trent Valley, Beaver, Prince of Wales, New Evergreen, Codrington, Norham, Burnley, Fenella, Rosemeath, New Model, Percy, Dartford, West Seymour, Beal, Forest, Rylestone, Stanwood, Empire, Kimberly, I. X. L., Woodlands, Crow Bay, Avon Bank, Trent Bridge, Round Lake, Victoria, Star, Brickley.

CHESTERVILLE SYNDICATE: L. A. Zufelt, Instructor.

Aults No. 1, Aults No. 2, Aults No. 3, Aults No. 4, Aults No. 5, White Globe No. 1, White Globe No. 2, White Globe No. 3, White Globe No. 4, McLean's No. 1, McLean's No. 2, McLean's No. 3, Goldfield, Grantley, Spruce Grove, W. P., Loraine No. 1, Connaught, Chesterville, Morewood, Smith's Hill, Ellis No. 1, Ellis No. 2, Inkerman.

CORNWALL SYNDICATE: J. Buro, Instructor.

Lake View, May's Fancy, Moulinette, Black River, Glen Walter, Farmer's Choice, Glen Donald, North Branch, White Rose, Sweet Brier, McMillan's Corners, Strathmore, Sandringham, Moose Creek, Mayflower, Cornwall Gems, Dixon, Farmer's Joy No. 3, Lunenburg, Avonmore, Cornwall Creamery, Glencoe.

KEMPTVILLE SYNDICATE: D. M. Wilson, Instructor.

Reid's Mills, Robinson's, Suffels, Gravelton, Scott's, Oxford Mills, Kemptville No. 1, Patterson's Corners, Malakoff, North Gower, South Gower, Taylor's No. 3, Green Valley, Taylor's No. 808, Carsonby, Twin Elm, Goodstown, Kemptville No. 2, Vancamp, Hyndman's, Oxford Station, Farmer's Union, North Rideau, Francais No. 1, Maple Grove, Dawson, Olive Dale, Gordon Model.

KINGSTON SYNDICATE: Geo. Robinson, Instructor.

Cataraqui, Glenvale, Cold Spring, Sunbury, Battersea, Kellerville, Railton No. 1, Railton No. 2, Perth Road, Hartington, Reynold's No. 1, Reynold's No. 2, Reynold's No. 3, Forest, Latimer, H. B., Model, Cornflower, Arigan, Pine Hill, Rose Hill, Keenan & Sons, St. Lawrence, Gilt Edge, Ontario, Harrowsmith, Elginburg, Bear Creek, Elm Grove, Petworth.

LANCASTER SYNDICATE: E. Wilkinson, Instructor.

Royal, Pine Hill, Glen Roy, Glen Norman, Glen Gordon, Bridge End, Picnic Grove, Glendale No. 2, Victoria, Glengarry Creams, Glendale No. 1, McGillivary's Bridge, King's Road, Bainsville, Banner No. 1, Banner No. 2, Currie Hill, Star No. 1, Glen Nevis, McLaughlin, Green Valley, Alpha

LINDSAY SYNDICATE: D. J. Cameron, Instructor.

Fleetwood, Ballyduff, Bensfort, Lang, Buckhorn, Myrtle, East Emily, Bobcaygeon, North Verulam, Reaboro, Mariposa, Dunsford, Maple Leaf, Omemee, Mount Pleasant, Cavanville, Crown, Cold Springs, Centretown, Spring Valley, North Ops, Palestine, Red Rock, North Harvey.

MADOC SYNDICATE: A. Herity, Inspector.

Victoria, Rock, Tweed, Stoco, Murphy, Bogart, White Lake, Alexander, Marble Springs, Cloyne, Kaladar, Boundary, Premier, Beulah, Madoc, Queensboro', Brook Valley, Spring Creek, Oak Leaf, Plainfield, Roblin, Clare River, Otter Creek, Eldorado, Roslin, Moira, Cedar, Moira Valley, Thomasburg.

MAXVILLE SYNDICATE: R. A. Rothwell, Inspector.

Sunrise No. 1, Sunrise No. 2, Aberdeen No. 1, Baltic Corners, Echo, Farmer's Joy No. 1, Clover Side, Maplehurst, Newington, North Valley, Finch, McLean's No. 4, Berwick No. 1, Berwick No. 2, Co-Operative, Crysler, Red Clover, Cambridge No. 5, Farmer's Joy, St. Albert, Mayerville, Canadian Produce, Gold Leaf, Goldfield No. 5, R. C. & B. Asso'n, Midnight Sun No. 1, Midnight Sun No. 2, Midnight Sun No. 3, Midnight Sun No. 4, Midnight Sun No. 5.

MORRISBURG SYNDICATE: C. W. Nowal, Instructor.

Edwards No. 1, Edwards No. 2, Edwards No. 3, Edwards No. 4, Edwards No. 5, Farran's Point, A. A. L. No. 1, A. 19, Elma, Bouck's Hill, Ashton's No. 1, Daisy, Mountain View, East Matilda, North Williamsburg, Model No. 1, Model No. 2, St. Lawrence, Matilda, Strathcona, F. F. No. 1, F. F. No. 2, McGregor, Matilda West, Mainsville, Maple Grove, B. C. No. 1, Mulloy's Gems, Colquhoun.

NAPANEE SYNDICATE: Geo. Bensley, Instructor.

Excelsior, U. E. L., Sillsville, Odessa, Metzler, Camden East, Newburgh, Selby, Kingsford, Forest Mills, Croyden, Centreville, Marlbank, Moneymore, Deseronto, Empey, Napanee, Union, Westbrook, Clareview, Palace Road, Amherst Island, Emerald, Bath, Farmer's Friend, Maple Ridge, Enterprise, Whitman Creek.

OTTAWA SYNDICATE: W. W. Dool, Instructor.

Jockvale, Hawthorne, Russell Road, Eastman's Springs, Blue Bell, Edwards, Banner, North Osgoode, Metcalfe, Cold Springs, Gilt Edge, Vars, Morning Star, Sarsfield, Greenwood No. 1, Greenwood No. 2, Navan, McGregor No. 1, Hillside, Russell No. 14, Windsor Star, Blue Joint, Blackburn, Pendleton, Spring Brook.

OTTAWA E. SYNDICATE: J. Villeneuve, Instructor.

Casselman, St. Adrien, Aurora, Fournier 89, St. Isidore, G. 557, T. P., Ritchance, Empire B., G. 124, W. S., Oxbow, T. D. 8, Q. M. G. 5, Russell No. 1, T. D. 9, Q. No. 1, A. No. 5, Nation River, C. Q. 1, C. Q. 2, Ettyville, A. 35, A. C. 4, Riceville, Bolt, Alfred.

OTTAWA W. SYNDICATE: R. Elliott, Instructor.

Admaston, Bonnechere Valley, Carleton Model, Diamond, Dirleton, Everitt's No. 1, Equal Rights, Gold Medal, Glasgow, Grattan, Hazeldean, Independent, Kidd's No. 4, Madawaska, Maple Hill, Pine Grove, Pure Gold, Pine Grove McNab, River View, Stonebrook, Union Pride, Union Star, Victoria, Waba, Woodlawn.

PERTH SYNDICATE: W. G. Gardner, Instructor.

Mississippi, D. & E., Tayside, Drummond Centre, S. & L., Fallbrook, Dalhousie Lake, Park Hill, Scotch Line, Harper's, Ferry Road, Fernleigh, Ardoch, Ferry Star, Tennyson, Bathurst Mutual, Moberly, Po'and, Hopetown, Middleville, D. & L. Union, Clayton, Farmer's Own, Balderson, Lanark and Darling, Plevna.

Syndicate.	Instructor.	No. of factories.	Full day visits.	Call visits.	Patrons visited.	Meetings held.	Tests for adulteration.	No. watered.	No. deficient in butter fat.	Money from fines imposed.	No. factories paying by test.	No. fermentation tests.	Percentage good.	No. factories repaired.	No. new factories built.	Total expenditure in improvements and new factories.	No. makers who kept factories clean and tidy.
Alexandria	A. McDonald	24	93	52	24	3	3,244	2	18	$225	....	300	30	9	1	$2,900	15
Almonte	W. J. Ragsdale	25	125	75	253	2	3,088	9	8	40	....	713	20	25	....	4,000	7
Bancroft	Jas. Irwin	18	101	49	.....	....	1,154	3	2	15	....	0	.....	6	....	530	7
Belleville	H. Howie	27	127	63	49	7	4,455	3	4	.....	....	118	.....	17	6	16,700	25
Brockville E	A. H. Wilson	25	126	106	155	5	3,508	11	10	75	....	627	60	22	....	5,833	20
Brockville N	P. Nolan	33	120	117	22	....	2,976	1	3	.....	1	191	55	14	2	5,000	25
Brockville W	S. S. Cheetham	30	126	117	139	4	2,452	5	15	100	4	630	30	19	4	9,120	15
Campbellford	R. F. Gray	28	125	105	15	1	3,185	1	4	.....	....	617	60	13	....	2,000	20
Chesterville	L. A. Zufelt	24	111	100	34	1	2,267	1	1	45	3	171	65	8	1	1,500	10
Cornwall	J. Buro	23	128	64	9	2	4,341	10	60	20	4	174	.....	25	....	2,760	16
Kemptville	D. M. Wilson	28	117	120	115	9	3,089	10	3	230	3	337	30	7	....	2,400	23
Kingston	Geo. Robinson	30	114	135	155	2	2,798	7	5	.....	....	39	7	20	....	2,220	20
Lancaster	E. Wilkinson	22	106	94	40	1	3,768	3	30	105	8	251	50	15	1	2,930	10
Lindsay	D. J. Cameron	25	105	36	62	....	3,628	3	3	.....	5	128	40	16	...	800	19
Madoc	A. Herity	29	140	149	235	10	4,852	3	4	50	....	175	40	15	....	3,150	24
Maxville	R. Rothwell	30	124	86	320	10	2,912	4	32	20	1	293	42	11	3	9,213	10
Morrisburg	C. W. Norval	29	140	93	238	2	3,045	6	6	90	2	870	75	6	1	3,000	10
Napanee	Geo. Bensley	28	132	62	144	....	120	12	1	160	....	485	70	11	2	3,750	20
Ottawa	W. W. Dool	25	104	129	30	1	1,712	5	1	50	3	81	69	7	4	7,000	23
Ottawa E	J. Villeneuve	27	134	86	99	5	3,930	16	10	15	3	240	10	22	3	5,500	5
Ottawa W	R. Elliott	25	101	90	127	2	1,595	2	3	95	2	308	80	9	1	3,900	16
Perth	W. G. Gardner	26	104	78	83	....	2,220	.....	7	.....	....	207	18	15	....	6,220	21
Peterboro	R. W. Ward	26	120	148	294	3	1,078	4	2	.....	10	147	55	26	2	7,342	24
Picton	H. Brintnell	23	123	68	218	5	182	24	4	85	....	300	10	5	2	6,300	18
Plantagenet	J. Charbonneau	26	112	97	81	2	2,823	18	11	105	....	264	22	2	1	1,000	6
Singleton	F. Singleton	22	108	121	138	6	2,700	2	7	85	....	344	71	19	....	1,530	14
Stirling	J. B. Lowery	28	125	114	239	3	5,364	4	5	.....	....	343	10	26	....	3,000	24
Vankleek Hill	C. Ferguson	21	83	148	34	2	1,770	4	8	190	1	17	10	6	....	400	10
Totals		727	3,274	2,702	3,352	88	78,086	173	267	$1,800	50	8,370	1,019	396	34	$119,998	457

PETERBORO' SYNDICATE: R. W. Ward, Instructor.

Apsley, Centre Smith, Daisy D., Indian River, Keene, Killarney, Lakefield, Melrose Abbey, Maple Leaf, North Dummer, Norwood, Ormonde, Oak Leaf, Pine Grove, Peterboro', Shearer, Stony Lake, South Burleigh, Selwyn, Shamrock, Trewern, Villiers, Warminster, Warsaw, Westwood, Young's Point.

PICTON SYNDICATE: H. Brintnell, Instructor.

Allisonville, Ben Gill, Bethel, Black River, Bloomfield, Clover Dale, Cressy, Cherry Valley, Elmbrook, Elmwood, Glenview, Hyland, Mountain View, Massassaga, Northport, Point Traverse, Quinte, Royal Street, Union, Union Vale, Waupoos, Weller's Bay, Maple Leaf.

PLANTAGENET SYNDICATE: J. Charbonneau, Instructor.

G. 868, T. W. No. 1, Alfred Cheese Co., A. F. W., 918, Canada, C. T. No. 3, Chard, G. 145, Ottawa Valley No. 2, Stonebrook No. 1, Canada 225, X. C. No. 2, The Lake 875, Plantaganet, North Indian, 238, Canada No. 2, Ottawa Valley No. 1, Centre, Cob's Lake, C. No. 5, Green Bank, Stafford, J. Q. No. 2, Hammond.

SINGLETON SYNDICATE: F. Singleton, Instructor.

Lombardy, Brooke, Taybanks, Elmgrove, Westport, Ontario, Golden, Prospect, Stanleyville, Ardmore, Mapleton, Mountain View, Model, Bedford Mills, Osceola, Greenwood, Rankin, Micksburg, Cobden, Westmeath, Beachburg, Clear Springs.

STIRLING SYNDICATE: J. B. Lowery, Frankford.

Deloro, Rose, Stirling, Spring Hill, Cold Springs, Shamrock, Champion, Glen, Bell, North Star, Kingston, Maple Leaf, West Huntington, Daisy, Plum Grove, Hoard's, Acme, Enterprise, Springbrook, Cook's, Evergreen, Wooler, Harold, Marmora, Spry, Central, Monarch, Riverside.

VANKLEEK SYNDICATE: Claude Ferguson, Inspector.

Farmer's Fancy No. 1, Farmer's Fancy No. 2, Lochinvar, Glen Andrew, Maple Leaf No. 7, McAlpine's No. 2, McAlpine's No. 3, McAlpine's No. 4, McAlpine's No. 5, Spring Grove No. 1, Spring Grove No. 2, Spring Grove No. 3, Aberdeen, Stardale, Barb, Golden Hill, Spring Creek No. 1, C. P. R., Hawkesbury, Dalkeith, Maple Row, Maple Leaf 39, Victoria, McLeod No. 4.

As I have stated, the number of factories that received regular instruction during the past season was 797, and to these the instructors gave 3,274 full day visits, for the purpose of giving practical instructions in cheese-making, and of inspecting the quality and condition of the milk arriving at the factories.

During the hot weather, when the milk is in its worst condition, the instructors had to keep a closer watch on the makers in their charge, and to do this, the factories had to be visited more frequently by what we term call visits. Of these a total of 2,702 were given. This number greatly exceeds the number of the previous year and partly explains the reason why the quality of the cheese was kept so uniform in the most trying time.

By visiting the factories at shorter intervals, and spending some time in the curing-room with the maker, the instructors are often able to be of much service in remedying defects in the cheese as if they had spent the whole day in the factory.

This is particularly true with makers who have a good knowledge of the principles of cheese-making, but who are liable to be confused owing to the varied conditions in which the milk is received.

And when I mention these conditions of the milk I regret to have to say that as a general thing there was not the expected improvement in the condition in which the milk arrived at the factories.

The nature of the season no doubt had its effects in influencing the quality of the milk, but back of it all there is the continued carelessness on the part of a certain percentage of the patrons. We have held a large number of meetings and discussed the care of milk, and a very great number of farms have been visited for the same purpose. So that I really believe that the number of patrons who now do not know how best to care for milk must be very small.

It is not because they do not know how, but because they do not furnish themselves with the appliances and utensils with which to work, and when the hot weather comes on they are practically at the mercy of the weather conditions.

It is true that a great many have made satisfactory improvements, but it is the one common story from nearly every section that a large share of the milk is over-ripe and of bad flavor, and from information received from our instructors I believe that more milk was rejected and returned home than has been in any previous season.

It may be that the makers are getting more particular, and are protecting themselves by being more careful in selecting the milk on the weigh stand, as in many instances it seems to be the only thing that will stimulate a careless patron to be more particular.

This year the farms of 3,352 patrons were visited by the instructors and 88 meetings were held, so that with all our efforts of education I cannot understand why so many fail to provide means of keeping their milk at a low temperature, when they must know what a loss they suffer when a can of milk is returned, especially when the market for cheese furnishes such satisfactory prices as have prevailed during the year just closed.

Nearly all the instructors report that a very large number of new milk cans have replaced the old rusted ones, and I doubt if there were ever so many new stands with facilities for cooling milk erected in one season; so that excepting for the neglect of a few patrons in each factory, everything points to an increase of interest and improvement by those who furnish the raw material.

A total number of 78,086 tests were made for adulteration of the milk; 13 of these samples contained added water and 267 were deficient in butter fat.

This is a slight increase over the number adulterated last year, and the sum of $1,800 was collected as fines from the offenders and paid into the factories of which they were patrons.

It is to be regretted that so many still persist in this work, and it seems that the only way of preventing it would be to pay for the milk according to quality.

Never in the history of my work as Chief Instructor have I been able to report such a great increase in the amount of money expended in repairing, rebuilding, and re-equipping the places of manufacture. A total number of 396 factories was repaired in some material way and 34 new buildings were erected. The estimated cost of these improvements amounts to a total expenditure of $119,998, and before the opening of another season this

amount will be largely exceeded. At present the amount is over $19,000 more than was reported last year, and represents one of the most encouraging results of the work of instruction.

In connection with these results we have to give a great share of the credit to the aid we received from the work of the sanitary inspectors. The improvements are being continued throughout the winter, and the coming spring should see a very marked improvement in the conditions surrounding the manufacture. Never were the factories kept in such a clean sanitary condition, and we owe our greatest appreciation for what we have been able to accomplish to the new sanitary laws regarding the manufacture of cheese.

One of the greatest hindrances of the past in getting the manufacturers to improve their buildings and equipment has been the lack of protection they were afforded by their patrons in return for the money expended. The price of manufacturing has been too small in many cases, and a factory owner cannot afford to make extensive repairs. Then again, he can never tell when some of his patrons will leave him or some one else come in and start a factory at a close distance and perhaps render valueless the building and business upon which he has spent so much. If factory owners could be given some protection in this respect, I am sure it would not be very long until the great majority of our factories were in a creditable condition.

Perhaps the most important branch of our work, and the one upon which our success most depends, is the quality of the cheese resulting from the improvements made.

In this connection I am pleased to report that the quality has been of exceptionally high standard, and although the makers met with a good deal of difficulty in the hot weather I doubt very much if we ever had such a successful year.

There was a marked decrease in the number of reclaims, and the June, September, and October cheese exceeded all previous corresponding periods for fineness of quality.

There was a surprisingly small number of acidity cheese, and in this respect alone the improvement is very worthy of mention.

It is quite evident that the makers are adopting more uniform methods, for, where formerly the cheese from whole sections was inferior, there are now only a few in each district who have any serious trouble.

By the skilful use of such appliances as the acidimetre, and pure cultures, aided by the greater attention that is being given to the cooking of the curd, there is no reason why the defects in the manufacture should not be largely overcome. The finish and general appearance of the cheese, too, has been given more attention by the makers, but they have still much to do in this important part of their work.

In the early part of July the instructors were given their third visit to Montreal, where the common defects found in the cheese were pointed out to them by the expert merchants. A number of representatives from the different cheese boards were also present on this occasion. The information gained by these men was carried home to the makers and patrons, and I believe a great deal of good resulted from this practical and profitable demonstration.

This year, I cannot but repeat in an emphasized way what I said in my last report regarding the shipping of cheese from the factories in a green uncured state. Caused by the high prices, this practice has been more common than ever, and the effects are being shown now by the reports of short weights and injured quality coming from the old country merchants.

I am glad, however, to say that a great improvement is being made in the curing-rooms throughout the country, and I trust that next season the cheese may be kept in the factories until properly cured, and without being liable to injury from hot weather effects.

During the season I keenly felt the absence of the official referee in Montreal. I find it very necessary in my work to keep in close touch with the export end of the trade, and in former years I used to get a great deal of valuable information from the weekly reports I received from Mr. Woodard. From this information I was able to keep the instructors well posted, and to notify them without delay whenever the cheese from any of their factories were being faulted by the buyers. To get this information during the past season I had to visit Montreal more frequently myself, and as a result I was not able to personally visit so many of the factories. However, I was able to visit 386 of the syndicated factories, and some 20 that were not in any of the groups. When on these visits I invariably found the makers much improved in their personal appearance. They kept their factories cleaner, the surroundings more tidy, and they received the assistance and advice of the instructors in a friendly and appreciative manner. I was also present at thirty dairy meetings, and as a rule found a good attendance, and those who attended showed an increase of enthusiasm in the work.

My opinion is, however, that splendid results can be accomplished by providing competent speakers to attend the annual meetings of the factories, when practically every patron is then present.

The instructors as a rule are doing good work, and are well acquainted with the conditions in their respective districts, and I know of no one who should be better fitted to address these meetngs than the local instructor. A number of such meetings were attended last winter, and the results in these factories have been very noticeable in the way of an improved milk supply and in the general interest taken by the people. The instructor, too, becomes better acquainted with the patrons, and they appreciate his efforts more readily the following season as they then better understand the true object of his work. That the people are becoming anxious for speakers at these factory meetings is well shown by the large number of requests I have received from all parts of the country. I must say that I regret that I have not had the time to be able to comply with more of these requests, but we cannot do everything at once.

I believe we have just finished the most successful year in the history of the instruction work and in concluding my report on the same, I must say that I feel we have accomplished results that will have a very material and permanent effect.

I want to express my appreciation of the conduct and work of the instructors. I have found them at all times willing and anxious to carry out my wishes and they have put forth an honest effort to bring about improvement in their respective districts.

I also feel grateful for the kind assistance of the Montreal merchants, who were always willing to help me in any way, and for the privileges they allowed the visiting instructors and factorymen while examinng the cheese in their different warerooms.

Before closing, too, I would like to thank the directors and members of the Executive of the Association for the active part they have played in the work of the year, and to express the hope that the coming season will see an even more creditable ending than the one we have just closed.

Prof. Dean: What standard did your instructors have for fat?

A.—If the milk goes below 3 per cent. the instructor went to the farm and saw the milk, and got a sample. If the milk delivered at the factory was below the standard got on the farm it was deemed deficient in fat. We found cows this year giving milk as low as 2.6 per cent.

The CHAIRMAN: That is the best paper that we have ever had at this convention.

Prof. RUDDICK: I want to congratulate Mr. Publow on his most excellent report, and I would like to congratulate the Dairymen of Eastern Ontario on being able to command the services of a man who is able to present such a report. I give place to no one in my admiration of Mr. Publow's work. I know something of what it means to carry on the work he is doing, and have had some experience in that line. Mr. Publow and I started under the auspices of the Dairymen's Association during the same year, and I know that no man has worked harder than Mr. Publow, and it is wonderful to me that he has been able to preserve his youth. I think he must have some secret.

I believe the sanitary system of inspection is the proper system. I believe it would be a decided advantage, if, in addition to the organization so far as it goes, there was a little further organization, and our syndicate was organized with officers for the syndicate: a President, a Secretary, and a Board of Management. In that way you would get a large number of people directly interested in the work, and it would be probably easier to reach the factories by having someone in communication with these syndicates. I believe it would be an assistance to the instructors, and you would get a larger number of people more interested. I am drawing my conclusions from experience in the Province of Quebec where syndicates were organized a good man years before they were in Ontario. I did say that I thought it would be better to wait until you were able to start them in that way.

Mr. PUBLOW: We adopted that system this year, and we are trying in every county to have the people nominate a man to represent them.

Mr. RUDDICK: I am glad to hear that. Another matter Mr. Publow touched upon which I think is of importance is that of shipping green cheese. I was glad to hear Mr. Publow's reference to the official referee in Montreal. I should be very glad to co-operate in any way with Mr. Publow in his work, and if the official referee could be of such service as he points out I think it is a very strong argument in favor of the appointment of a referee. The position has not been refilled since Mr. Woodward resigned. I would be glad if this Convention would give an expression of the desirability of having a referee.

A MEMBER: In curing good cheese in cold storage, and at a low temperature, is it a bacterial or a chemical change that takes place?

Mr. RUDDICK: The temperature at which it is cured does not effect the matter in any way at all. It affects the rapidity of the change which takes place. The best authorities agree that there are two processes in the ripening or curing of cheese, one of which might be called a chemical process, and another process which may be called a bacterial one. One has to do with the chemical or digestive process, or with the change of the curd from that insoluble condition into a soluble one, nd the other process has to do with the development of the flavor. There is much to be learned yet of the changes which take place in a cheese during the ripening process, but briefly I think that covers the point.

A MEMBER: There is an article published in the *Canadian Dairyman* from the pen of Mr. Barr, in the issue of June 15th, which refers to the removal of curd from whey, regardless of the cooking. Going by the amount

of acid that is provided, you are dipping curd at 18 by the acidimeter; would you recommend removing the whey at 17, regardless of all other conditions? I would like to have an explanation from you on that point.

Mr. Publow: Our experience is that when we handle curd in the vats I find that it is not best to remove in a soft condition. What Mr. Barr says might apply to the west, but in the east where we handle the curd on the pan we have obtained better results from keeping the curd until sufficiently formed. I recommend that you get your whey out of the curd as sweet as possible. It is not safe to remove a curd in a soft condition because it mats up very rapidly. You should endeavor to get the curd formed before the acid comes on, but if the curd is quite soft it is better to hold it there. It is not the whey around the curd that brings on the acidity. In handling this thick milk it is advisable to draw with as small an amount of acid as possible. To the makers who are using racks I would say to draw as sweet as you can. Curds coming off in a short condition must have less acid.

A Member: Do you think the cheese will be delivered to the consumer in a better condition than if you have the curd a little less cooked in the whey, and left with a little less acid than to cook them properly in the whey?

Mr. Publow: I recommend that you try and get the first working curd to work just the same out of the whey as normal working curd. You can do that by cutting fine, and getting the moisture out while it is in the whey, and cook higher—perhaps as high as 106 degrees—depending on the ripeness of the milk; and when you get it as firm as normal working curd, remove the whey and put it in two or three pails of cold water, if you have good water. That prevents the curd from matting, and you get the best results in that way. We have had the ripest milk this year that we got in six years. We have had milk in a worse condition, owing to the extremely unfavorable weather, and the cheese have shown less acid. The danger, perhaps, in drawing these curds off soft and sweet is that you get your cheese open; but I do not know that is such a serious difficulty. I think we have laid too much stress on closeness. While it is desirabl our cheese should be close, I would prefer to have them slightly open and with less acid. I think any person would rather have cheese with a few holes in it if they were smooth and nutty in flavor. I am glad to know that the merchants in Montreal are not laying so much stress on that. If the cheese are clean and nutty in flavor you do not hear much complaint.

Mr. Macpherson: A number of patrons show arele sness in the care of their milk, and I think that is the key to the whole situation. That being the fact, what method or what way should this Convention discuss the question of how to make these careless patrons take more care of the milk? I have been thinking that as the Government is offering prizes and medals and in many ways trying to improve many things, I should think there could be a prize given for the best product of milk, so as to encourage men to take better care of it. I think it would be a splendid thing to have these careless patrons, from year to year, offered a prize, in order to make them more careful. I would suggest the syndicates to offer a prize to the patrons who delivered the best milk.

Mr. Putnam: I have been wondering how many makers make it a point to go to their patrons in a kindly way and give them instruction as to the best methods for the care of milk. It appears to me that if the maker was properly interested in his work he should go to the patrons and take them into his confidence, and give them all the assistance he could, and ask them for suggestions regarding his own work. Many of the cheese-makers

are in it just for the present year, instead of thinking it as a business, they are going to spend their life work at.

Mr. Publow: I am pleased to say that the makers are putting forth greater effort along that line than ever before. It is difficult to get men who are capable of doing this work. It is surprising how many men lack the ability to do that kind of thing. I would strongly recommend the dairymen of this country to make the business of cheese-making more attractive to our bright, intelligent men. Boys cannot do it; it requires old heads as a rule to deal with older men. I know that we get the best milk where we have the brightest men on the whey stand; men who have the knowledge of how to handle people. I care not how skilled you are and how good your building is, if the raw material is wrong, your product will be defective. We are trying to set an example and get better milk in some sections. We have all the patrons coming to the factory, and the people are all seen by the instructor every morning at the stand because they are all there. Owing to the small prices that have been paid to makers, and a shortage of help, the managers of some factories have had no opportunity of getting out among the people. We should not depend on the Government to do everything. When you find the milk being delivered to the factory in an improper condition, call your people together and say "Gentlemen, this milk is not in condition, and I cannot give you good results."

A Member: Make it compulsory.

Mr. Publow: I went to a large factory, and the cheese were wrong. The maker was a good maker, but the patron's milk was in such a poor condition that I knew it was the cause. I said to him, "Why don't you send the milk home?" and he said, "Well, if I did he will go some place else. I wish you would call a meeting." I called a meeting for the next Wednesday night, and I had an instructor come there and take a sample, and I came that night and addressed the people. I do not think I ever saw milk in a worse condition, and I gave the people a fair talk with regard to the care of milk. After I got through I sat down, and the President of the factory got up and said, "That was a splendid address, but what business have you to come here and talk like that when our cheese are being selected on the board first call, and we get the very highest price." How do you think I felt? The fact of the case was the cheese had been cut in price the last three weeks, and president of the factory did not know it, and the patrons did not know it. The cheese-maker had made arrangements with the buyer that at any time his cheese were rejected to make out a check in full and he would pay the loss. Now, if the cheese-makers are going to do that kind of thing, how is your instructor going to help you? The people found out afterwards what was the matter, and now they have a different man to the one they had. I said to the President, "Is it possible that you did not know that your cheese had been rejected?" and he said, "No, the buyer was not honorable enough to come forward and tell them." That was one reason why that man lost his factory, and I hope he will never get a factory in this country, or in any other country again. A man that will do that sort of thing is not fit to run a factory. (Applause.)

DAIRY BACTERIOLOGY.

By W. T. Connell, M.D., Queen's University, Kingston.

The subject of dairy bacteriology while extensive and of much importance practically, yet offers but few topics capable of general treatment—such a treatment as must be given before an audience who are not interested in technical details, but who desire to have any new findings set before them in an assimilable form, or the old again presented in as new a dress as possible. As years pass it becomes to me a matter of increasing difficulty to so modify the old story as to make it appear new. Inded, to those on the platform it will be but an old story after all, but to my audience much may yet be new despite the attention which has been paid to the subject in the agricultural and dairy papers. I may state at first that I have little new to offer, as I was prevented undertaking any work by the burning of my laboratory early in summer, and it was only in October, after the regular college course had opened, that I was in a position to undertake any but the simplest work.

By way of introduction let me first point out that bacteria—or germs as many call them—are simply minute plants, so minute that powerful microscopes are required for the detection of the single plant. Bacteria are the smallest forms of plant life as yet made visible. Like other plants, they will grow rapidly when suitably nourished and kept at a favorable temperature. Indeed a bacterium may increase from a single plant to many million inside of twenty-four hours, when favorably situated in these regards. Thus rapidity of growth soon compensates for minuteness of size. Bacteria of different kinds are present almost everywhere, being found in air, dust, earth, and water; but very many of the kinds so found are of no importance whatever in so far as dairy work is concerned. The bacteria which are of importance in dairy work are those which, when they find their way into milk or its products, are capable of developing therein and producing some change in their constituents, setting up what we may term fermentative changes. Dust and water, and the like become dangerous to milk only when they contain such bacteria, and they contain dangerous bacteria practically only when they come from dirty or foul sources, even though to ordinary observation they may appear to be free from such contamination. Manure and manurial dusts are always loaded with bacteria, capable of developing in and fermenting milk, and fermentations set up by entrance of bacteria from such sources are very common indeed.

As you all know, it is the rule for milk when kept to undergo some fermentative change, and the common change is souring and curdling and usually the higher the temperature (up to 100° F.) the more rapid the change effected. Examine now this souring fermentation, for it is of bacterial origin. We will note that the character of the souring often varies. Sometimes we have a clean sour with a pleasant aroma, no gas in the curd, and the whey which separates from curd is clear; again we find sourness with more or less gas in the curd, and the whey slightly turbid at times, even milky; and with this we may find various flavors varying from "not clean" to "rancid." Combinations of these are found; or one may succeed the other and be followed in turn by other changes such as discolorations breaking down of curd, etc., these being due to further action of bacteria, or to others which probably do not grow till after souring fermentation has ceased. I want, however, to call attention to the two main types of souring, for the bacteria which are active in this process are also

active in like fermentative processes in butter and cheese making. We have outlined two main types which I may term the clean souring type, and the type which causes souring with more or less gas production. The most typical bacterium of first type is the bacterium known as the *Bacillus acidi lactici* (Esten) called by some *Streptococcus acidi lactici*. Of the second type we have two forms, the *Bacillus coli* and *Bacillus lactis aerogenes*, which in some respects are closely related. Combinations of the first with one or both of second type are quite common, and when so, if the *Bacillus acidi lactici* is present in any numbers, usually it exerts a marked influence in controlling flavor.

In the ripening of cream in butter making, the process is largely one of acid production, and the bacterium which is usually found is the lactic acid bacillus of first type which has also the features of developing a good flavor and aroma. It is not uncommon to find as many as 500,000,000 bacteria per 1 c.c. of cream when well (but not over) ripened, which is equal to about 30,000,000 per drop. If the acid production is by bacteria of the second class there will be considerable tendency to flavor defects, especially cowy flavors, and while in some cases these will not be noticeable at once, such butter has poorer keeping qualities and tends to become bad, even putrid at times. I have an opinion, which I have not been able to prove, that such butters are particularly prone to develop butyric acid, and thus become rancid.

In like manner in the manufacture of our Canadian cheese, one of the most important features is the development and control of the acidity. This acid production is most actively produced by the bacteria of the first type, and with it we have the development of proper flavor; while in bacteria of the second type, though we may have acid production, it is variously accompanied by gas production even to extent of floating the curd, and also with more or less flavor defect. The reason for this I will endeavor to explain a little later.

The type of desirable fermentation, then, in both butter and cheese-making, is that produced by bacteria of the species *Bacillus lactici acidi* (Esten). What are the sources of this bacterium? Usually it is quite abundant in and about dairies and factories which are reasonably clean. It is often present in the foremilk, and may be found in milk pails or cans not thoroughly scalded. Practically, under ordinary conditions, it is almost constantly present in milk, and as it is capable of thriving well in milk even as low as 65 F., its presence, unless the milk be heavily seeded with some other bacterium, is assured. Further, once this bacillus has started to develop well, usually it can control or check the development of other bacteria unless heavily seeded.

Lactic acid bacteria of this type are the basis of good starters, and it is cultures of these bacteria that are sold as "Startolene," "Lactic ferment," etc.

Now as to bacteria of the second type as represented by *Bacillus coli* and *Bacillus lactis aerogenes*, these bacteria are also very common about dairies and stables, and altogether too common about many of our factories. The *Bacillus lactis aerogenes* especially is like the lactic acid bacillus in that it finds in milk an excellent medium in which to rapidly develop, although ordinarily it does not quite equal *Bacillus acidi lactici* in this respect.

The *Bacillus coli and Bacillus lactis aerogenes* are almost constant inhabitants of the excrement of cattle, and of other animals and fowls.

Excrement itself, excrement laden dust, or excrement polluted water are the main sources of infection with these bacteria, and such infection is altogether too common. Of course infection may also come from improperly cleansed cans when these cans have contained previously infected milk, or carried back infected whey. It has been shown time after time that the ordinary cleaning which cans get at farms very rarely succeeds in making them bacteriologically clean.

Right here let me digress a moment to speak of the character of some of the cans which are still coming to our factories, rusty, full of seams, which it is almost impossible to cleanse, and in which one can see gross dirt, no microscope being required; even cans with rags stuck into holes are not yet altogether out of date. It is not possible with the methods now in use at the farms to so cleanse such cans as to free them from bacteria. Only steam or prolonged action of boiling water could sterilize these cans, and neither are readily adaptable at farms. It would pay every farmer to have properly constructed cans, first in milk saved, and second, in ease of cleaning such.

To go back to the acid forming gas bacilli again: These bacilli, in growing, ferment the milk sugar with production of lactic acid and other products, especially gases, but they also have some tendency to break up the casein leading to formation of ammonia and amines and like derivatives. If these latter products are formed, the acid fermentation is checked, and may be neutralized, and it is the further development of these derivatives which leads to many of the bad flavors. I am quite aware that in ordinary curing of cheese, products of the nature of ammonia and amines are normally formed as the result of the digestive action of the pepsin of the rennet; but I am here referring to the early development of these substances which indeed may occur in the vat. Nearly every cheesemaker will have had experience of cases where acidity has developed quite rapidly, usually with some gas, and then the acidity is checked, and it seems impossible to get more acid to develop. These are the class of cases where *Bacillus coli* or *Bacillus lactis aerogenes* are the common causes.

The more samples I examine of cheese that have some flavor defect, the more the role of these gas producing acid forming bacilli in the production of such defects is impressed upon me. Let me point out here a matter which we bacteriologists have to contend with. There are nearly 100 different varieties of bacteria already described by bacteriologists in the *Bacillus coli* and *Bacillus lactis aerogenes* families, and these varieties differing slightly among themselves it is which probably accounts for the variety of conditions induced. Further the action of these bacteria is much modified by the treatment during manufacture, the activity of the curing ferments, the temperature of curing, etc., so that the problem is an exceedingly complex one.

But it emphasizes one point and that is that the only desirable fermentation required in butter and cheese making is that induced by bacilli of type *B. acidi lactici*. Further, the undesirable types of acid fermentation can be kept out by care in milking and handling of milk, seeing that the causes of such bacterial fermentation come from excrement itself, excrement laden dust, excrement polluted water or from soiled utensils. The remedy is self-evident, viz., *cleanliness*. As an adjuvant, cooling of the milk ranks next. For bacteria need to have the temperature conditions favorable before they can develop. Cooling of milk checks this

development, and milk in summer ought to be cooled as near 60° as possible and as early as possible.

During this past season I have had a fair number of farm well and factory waters sent me for analysis. I must again report that it has not been possible to rank more than 20 per cent. of these as being beyond suspicion. Five to 10 per cent. were doubtful while the balance, viz., over 70 per cent., were contaminated with bacteria classed as being of intestinal origin, some being grossly polluted. I must state, however, that samples are only sent me when suspicion falls on a water, and my experience so far goes to show that when doubt arises as to the purity of the water supply there is usually grave reason for it. Altogether too little care is taken at the average farm, and even at factories, to see to the purity of the water supply, yet pure water is essential to continued health of the individual, and a necessity of dairy work both at farm and factory. The dairyman is no worse, but rather better off in this respect than the general run of the population in our villages, towns, and even cities. Prof. Osler might well make light of our advances in sanitation, and point to the prevalence of typhoid fever, which is essentially a water-borne disease, in proof of his statements. I have not figures at hand, but I feel fairly safe in stating that there have been nearly as many cases of typhoid fever in the Province of Ontario this past year (1906), as in England and Wales, with a population nearly 20 times as great. As a people we are extremely careless in the disposal of our refuse and waste; it is allowed to pollute our sources of water supply, and we pay the price in a high case and death rate from enteric disorders, and the toll has been heavy in many of our towns, villages, and rural communities this past season. It is high time that the people of this Province looked more carefully after the purity of their water supply, not only in the interests of dairying, but in the interest of public health. Too much altogether is expected of the earth as a purifier of our water supplies. It is true that soil is an exceedingly efficient filtering medium, but too many farmers demand 24 hours work 365 days in the year in this respect, and it can hardly be supposed that even soil would stand this overly long.

I have again had brought to my attention by Mr. Publow, two instances of "rusty" discoloration of cheese, and in both instances I detected the same bacterium as was first demonstrated by me in 1896 from a factory in Leeds Co., and which I named *Bacillus Rudensis* (after Mr. Ruddick.) Both samples were secured by Mr. Publow from Montreal. With one he was not acquainted with the factory conditions; while the second occurred in a factory which was defective in structure and drainage to an extent sufficient to account for the origin of the defect, though the conditions were not so serious as these I described in connection with factory in which this condition was first worked out.

Mr. McCrady: I did not notice it myself, but a neighbor who was in cause any taste to the water?

Dr. Connell: Nothing in the pipes. There may be something in the water which would act upon the galvanized iron pipes, but there is nothing in the pipes themselves to produce any defect in the water.

Mr. McCrady: I did not notice it myself, but a neighbor who was in said the water had a peculiar taste, and he knew of another neighbor who had to discontinue the use of his well.

Mr. Ruddick: There is hardly a house in this city but is fitted with galvanized iron water pipes. When the pipes are new there is very often a peculiar taste. It comes from the lead that is used in making the joints.

A Member: What does Mr. Publow think with regard to a steel or iron whey tank?

Mr. Publow: I think they are the best kind, and I would strongly recommend any factory manager to put a steel one in. Prof. Dean has had experience with one in the Ontario Agricultural College, and we have had some put in, and in every case they have given satisfaction. There are many reasons why they should be put in. In the first place they never leak, and they are very easy to keep clean. They can be washed out and kept clean and dry. I would prefer a steel one to an iron one. You can get them from any boiler maker or manufacturer.

A Member: I would like to ask Mr. Publow if he would recommend the grading of cheese. I think the exporters should explain what their views are on that question?

Mr. Publow: They are pretty well graded as it is.

A Member: You say the patrons do not know the grades?

Mr. Publow: I believe there is nothing that would lead to improvement more rapidly than the grading of cheese and if cheese were bought entirely on their merits. (Applause.) Whether the trade in this country is in such a condition as to warrant it is another question. I think every merchant in Montreal is capable of judging his cheese. When I referred to the work of the official referee I was speaking from the standpoint of dairy education, and while I recognize the ability of Montreal merchants to judge cheese, yet, when I get reports from 15 or 20 men I cannot place the same confidence in them as I could from one man when I know his judgment. We have twenty-eight instructors trained to one standard. I have insisted upon our inspectors having a standard of perfection. We must have some ideal, and if there be any fault it is our object and duty to bring it before your notice. Very often cheese are defective but they pass Montreal; but we should make your cheese so that they cannot be faulted by any person, and I think the instructors should set their standard so high that, if the cheese come up to it, it will pass any person. We had fewer claims this year than before, but I do not want you to say that we did not have poor cheese. Many of the cheese passed the market because there was a good demand. Some of the buyers in Montreal are reporting that the cheese are defective, but they take them because the market is good.

A Member: I do not think we will ever be satisfied short of paying for cheese according to quality.

Mr. Publow: I think we had better work up to things. I think it is well that our own people should know the condition of affairs, and I am afraid, if you take stringent measures at the present time, you will wipe out a lot of our makers. We should work up to it, and we are doing it fairly fast. The tendency of the trade is to work along that line, and I think we will come to it.

A Member: What do you consider the weakest link in this whole system. It is quite evident there is a lot of cheese placed on the market that should not be, and I saw by the London papers that the wholesale merchants are advertising New Zealand cheese, where they have the grading system. They are advertising it as the finest in the world. I am inclined to doubt it. There is no doubt we have here in this country a naturally good climate in which to make cheese, and our people are as intelligent as any place else and there is nothing to hinder them from putting up as good a quality of cheese as any other country. I do not believe there is a man in this country knows his business better than Mr. Publow, and I would like to ask him

what he thinks is the weakest link in the chain—whether it is shipping green cheese or a poor quality of raw material.

Mr. DERBYSHIRE: You must not be led away with any idea that New Zealand or any other country in the world is doing anything in connection with the cheese business in comparison with what we are doing. How is it we can sell 85 per cent. of all the cheese that is sold on British market if we have not the stuff that will exactly suit the market. (Applause.)

Mr. RUDDICK: I know something about the comparative quality of New Zealand and Canadian cheese, and I have no hesitation in saying that the Canadian cheese is very much better made cheese than New Zealand cheese. (Applause.) But I believe that the average quality of New Zealand cheese, as landed in Great Britain, is as good, if not better, than the average quality of the Canadian cheese. We sometimes forget that the cheese are only half made when they are taken out of the hoops, and that what follows always has a great deal more to do with the condition of the cheese than anything else. A great deal of our finest made cheese is utterly ruined because it is not properly handled after it is made. It is cured in the summer time at a temperature altogether too high for Canadian cheese, and which New Zealand has not got to contend with. That is the point. The average temperature in New Zealand will not go above 65 degrees; in extreme cases 70 degrees. The great bulk of their cheese is cured at a temperature of 60 to 65 degrees. They are talking of putting in cool-curing-rooms. Some of them are doing so already, taking the plans I furnished. They have no hot weather in New Zealand, and there is no question of June or July cheese or September cheese; they are all New Zealand cheese, because the climate conditions are the same throughout the whole season. I believe New Zealand are giving nearly as good satisfaction on the London market as our own, although they are not so well made. New Zealand cheese does not compete with Canadian. They never did and never will, because they are made at the opposite period of the year.

Cheese coming from New Zealand are fresh made cheese, and they are not competing with ours. If fresh made New Zealand cheese were competing with fresh made Canadian cheese, there would be a very different story to tell. They have made rapid improvements under Canadian instructors. One of their instructors is a son of Mr. Singleton, and he has done great work out there. (Applause.)

The New Zealand cheese-makers do not understand the process of making cheese as our cheesemakers do. There are less than 100 cheese factories in New Zealand. New Zealand will show an increase of 50 per cent. over the previous year. That only means that the combined factories made cheese last year instead of butter. There has been very little increase in the number of factories in ten years.

Mr. SINGLETON: Mr. F. J. Everttts, of Brockville, stated on the board under the authority of the Commissioner of New Zealand, that the country had received two or three shillings per hundred more than the Canadian cheese had received, and we felt as though there was some person after us when that report came out from such an excellent authority as the Dairy Commissioner of New Zealand. Their position and condition is so much better than ours that they are bound to get ahead of us if we do not change our plan in some way. Their factories are larger. It would take a dozen factories in this country to make as much cheese as they make in one factory in New Zealand. That is one reason why they are getting ahead of us, and why every section of Canada that has a large factory is getting ahead of a section where smaller factories prevail.

Mr. Wieland: I think a point Mr. Singleton raised places the matter more on a commercial status than any other. Mr. Ruddick stated that New Zealand offered cheese at a certain time when it does not compete with Canada, and the reason they get a higher price is this, that they put their cheese on the market when cheese is very high. I think it is wrong to get it into your head that prices determine the quality of the cheese. You might sometimes get a low price for a very good article. I have bought end of July cheese in Montreal in 1893 or 1894 which was the finest quality of the year. I bought this cheese at nine cents, and they would knock the spots out of anything I am paying thirteen cents for this year.

Mr. Singleton: I am not saying it is true, but I am saying on the authority of Mr. M. K. Everts, who quoted it on the Brockville Board, that their cheese was as good as ours, cheese for cheese.

The Chairman: They commence to sell their cheese when we are through making cheese. They make during the winter time, and if the price is high in the winter time, they benefit by it, and if the price is high in the summer time, we benefit by it.

A Member: I must thank these gentlemen for discussing this question. I saw that advertised in a London paper, and I am very well pleased with the explanation that has been made.

Mr. Publow: I think there are two or three links in the chain that want strengthening. Probably one of the first is undue competition or selfishness. The next two that most require to be made is the quality of the milk delivered at the factories. We want it delivered in a cooler condition, and then we want the curing rooms so constructed that cheese may be kept there for a long time at a uniformly low temperature. With these things corrected, we fear no nation in the world. We can make the finest cheese in the world.

MOISTURE IN CHEESE AND BUTTER.

By Prof. H. H. Dean, Ontario Agricultural College, Guelph.

The topic I have for this afternoon is more or less a technical one, and I hope I shall be able to make the points clear, so that you will understand what I have to say on that particular point.

The question of moisture is a very important one. Moisture is found in all dairy products. Milk itself contains over 87 per cent. of water: that is to say in 100 pounds of milk there is more than 87 pounds of water, yet some people think that it is not quite enough and put in a little more. Cheese consists of about one-third water, butter contains from 12 to 15 or 16 per cent., and in some cases more than that, of water. Moisture everywhere plays a very important part in all our dairy operations. I would like to make at the beginning this clear distinction between the water found in milk, water found in cheese, and water found in butter. A well known chemist said some years ago that there was no difference betwen water in milk, water in cheese, and water taken out of the well; but I hold there is a marked difference, and my conclusions in this respect are verified by the recent work you have probably seen by McKay, wherein he comes to the conclusion, after a great deal of experimenting, that there is a difference between the water found in milk, the water found in cheese and the water found in butter, or

the water found in a well. Will you bear in mind that the water which we have in our cheese is the natural water of milk, and it differs from the water you have in butter, from the fact that the water in butter is taken out of the well, it is not the natural water of the milk. Therefore we may reasonably expect that cheese may carry more of this natural moisture than is to be found in butter. My personal opinion is that good butter should contain a small amount of moisture of water, but that cheese may reasonably contain a rather considerable amount of moisture. A fine quality of dairy products is of more importance than a large quantity. There is a tendency to sacrifice quality for the sake of quantity; that should never be done. I would like to make this point clear right at the beginning that anything we have to say on this question emphasizes the point of quality being more important than quantity.

Now there are various methods that have been adopted for determining the moisture in the various dairy products, and I shall deal first with some of these methods, and secondly with the practical results.

We have been following a plan recommended by chemists for determining the quantity of moisture in butter. We melt a sample, taking it first in a sample bottle like the one I have here. We take about three or four ounces of the butter and melt it. We take about six cubic centimeters. That is about one-third as much as you would take for the Babcock test. We put that into a dish which has been previously weighed. We then transfer it to an oven, such as I have illustrated on this chart, and we dry it for six hours, and then dry it again for one or two hours. Let me say a word about this oven. We simply tap an ordinary steam pipe in our buildings with a quarter inch pipe. There is a regulating valve which allows the steam to pass into the oven, so that the pressure never gets too high. We find it necessary to have something of that kind otherwise there would be danger of our oven being spoiled by people who come in to inspect the dairy, because nearly everybody wants to turn all the cranks and open all the valves that can be opened in the dairy. The steam enters the upper part of the oven, which is 6 by 8 inside, having a one inch space on both sides, top, bottom and the back, but no space in the front, the door shutting straight against the parts where the steam comes inside the oven; there are two racks with perforated holes, and these are movable. We have an outlet for the gas and condensed steam. This is also connected with a quarter inch pipe, and then we have a steam gauge showing the amount of pressure on the oven. The whole thing, outside of the safety valve, cost us $5. You may think that means too much work for the cheese-maker, but I hope to be able to show you before I get through that it is practicable, and that it is important to know the moisture of the curds which you are handling from day to day. We found that it was necessary in the first place to find out how much moisture there was in the average curds.

We have heard a great deal to the effect that we know all about cheese-making, but, if you will pardon me, I wish to say that I think we know very little about the principles of cheese-making. Is there a man in this meeting who can tell me how much moisture there is in curds when he dips them out of the vat into the curd sink, or if he simply handles them on the pan? Is there a man in this audience who can tell me how much water he has left in his curds? Is there a man in this audience who can tell, within one per cent., of the amount of moisture from day to day, or even within 5 per cent. of the moisture in these curds? I doubt very much if there is a man here who can do it. I have decided that matter with our own chese-maker, and I find it is practically impossible for him to leave the same amount of moist-

ure in the curds on the same day, and they vary greatly from one day to another, and our cheese-maker has had ten years' experience. At least one-third of the cheese which you manufacture consists of moisture. It is necessary for the proper texture and for the proper fermentation of the cheese that you shall have the right degree of moisture. It is only reasonable that the cheese-maker shall know just how much moisture is being left in his curds from day to day.

The first thing we had to do was to find out how much moisture there is in a normal curd, and in the cheese after they have been made, and so far as I know that point has not been investigated at all.

Before I take up the results of our work, I want to say a word about a short method, because I can readily understand the cheese-maker would consider this too much trouble and expense. We have been working for two years on a method which I would commend to you, not because we consider it perfect, but because I consider it a step along the line on which I have been speaking—that is to get uniform moisture in the curds from day to day. Most of you have read about the method perfected by Professor Graham, of the Department of Agriculture in Washington. I have had correspondence with Mr. Graham and Mr. Webster, and they have promised to send us a set of apparatus for testing. Mr. Graham tells me the apparatus is not free except to the people of the United States, and any country outside of the United States that wishes to use this method must pay for it; but he offered to send the apparatus to us in order that we may test it to see whether there is anything in it or not. I would like to see a few cheese-makers try this plan which I shall outline to you. There ought to be some relation between the weight of a given volume of curd and the amount of moisture which it contains; that is the theory I started out with in the first place. Every advance which has been made in the dairy business in this country has been the result of a theory of some man. My theory was that a given volume of curd would contain a certain amount of moisture, and that as you reduced the moisture in the curd that the weight of the given volume of curd would get greater, but after I came to work my theory out I found the very opposite of that was true; that a given volume of curd, as we take the moisture out of it, grew lighter. That is one of the things that puzzled me for a long time. I thought it would grow heavier, but I found that it grew lighter, and I puzzled over that for a long time to know how that was, and I am not sure that I have it yet.

You will find all the details of our experiments in the annual report of the College. We found that 17.5 c.c. of curd, which has the same volume of acid you use in making the Babcock test, will weigh about one-tenth of a grain less for each six-tenths of the per cent. of moisture that is reduced in your curd. For every six-tenths of your moisture you stir out of your curd 17.5 c.c. of the curd is reduced one grain in weight. The theoretical explanation for this is that one-tenth is about six-tenths of one per cent. of 17.5. This is the mathematical relation which lies between one-tenth and 17.5. I have found as a result of practical tests covering over 100 tests, that is the relation which exists between the reduction of the moisture in the curd and its weight. Every time you stir the curd to reduce it six-tenths per cent. you reduce the weight of 17.5 by one-tenth of a gramme. Every time a given body of the curd is reduced one-tenth of a gram you have reduced the per cent. of moisture by six-tenths per cent.

I do not consider these figures perfect, but I give them to you in order that you may test the matter in your factories. There are plenty of men who cannot make a proper rennet test because they will not measure the

rennet and the milk accurately. They will not note the temperature accurately, and the man who is not accurate in these points will make a failure with that test. I think the man who is accurate in his tests will get uniform moisture in his curd day after day.

Now, I will give you some practical results with reference to moisture in butter. We have not found that there is any definite relation between moisture and what is called over-run. May I say a word about what is meant by over-run. By over-run in butter making we mean the excess of butter over fat in the milk or cream. For instance, if you take in 100 pounds of fat and you make 116 ponds of butter, then your over-run is 16 per cent. A great many people think if they have 84 pounds of fat and make 100 pounds of butter, their over-run is 16 per cent. In that case the over-run is over 19 per cent. We have found there is no definite relation between moisture in the butter and the over-run. We found, following exactly the same method, on May 7th and 8th, an over-run of 16.27 per cent. and 17.8 per cent—a difference of nearly 2 per cent., following exactly the same plan. On May 12th the over-run was 21.7; on May 15th, 18.7; on May 17th, 20.9; on April 24th, 16.5; on May 25th, 19.1; and on May 1st, 21.5. We found that wherever we adopted the plan of increasing the over-run or to make more buter out of a given amount of fat, we did it at the expense of quality. I think I am safe in saying that a good many of our butter-makers in Western Ontario this year sacrificed the quality of their butter in their great desire to get a large over-run. In cheese-making the curd should contain from 47 to 48 per cent. of moisture, and then the cheese would contain about 35 per cent. of moisture when they were green. We found the curds having from 50 to 52 per cent. of moisture, so that the yield was increased a half pound to one pound per thousand pounds of milk, while in the majority of cases the cheese were not quite so good. In one case where we had cheese scored by Mr. Barr and Mr. Waddell, they scored cheese normal in moisture at only 92 while cheese containing over 50 per cent. of moisture when the curds were dipped were scored 94.5. We sent these same cheese to Montreal, and had them scored by Hodson Brothers, (and I desire to say that we are very much indebted to this firm for their great kindness during the past year), and they scored them at about the same.

It may be possible for the cheese-maker to increase the amount of moisture in his curd at dipping time and increase the amount of moisture in the cheese, and at the same time make a finer quality of cheese; but I would not like to have you run away with the idea that you should advocate loading up your cheese with moisture. This is a very important question, and one or two season's experiments will not settle the question. I believe there is a tendency in the trade at the present time to pay a higher price for goods with a meaty texture. In talking with a cheese buyer in the old country in 1905 there was this uniform expression that they did not want a bony cheese or a hard cheese. I think we have been making a mistake in this country in getting our cheese too hard and dry, and the cause of that was that we did not leave enough moisture in the curds.

Now, I advise you to go slowly. Do not say Prof. Dean advised you to load up the cheese with moisture; because you will find when you have more moisture in your curd the acid develops faster, and you have to be a better cheese-maker to handle such curds; but I do think that with a skilful cheese-maker, and one who understands his business, it is better to leave from 50 to 52 per cent. of moisture in the curd at the time of dipping, and at the same time make a cheese that will suit the markets a great deal better than a dry bony cheese. Hodson Brothers scored this cheese at 99 points,

and the cheese that was made with the normal amount of moisture of 47 to 48 per cent. they scored 97. They took 2 off for texture and 1 off color.

I would like you to think over these things carefully, as they are points of great value to you as practical cheese-makers. I feel strongly that we are working along definite lines, and it is a pleasure to find that a few of the things we have advocated in years past, and which have been ridiculed, are now being advised by these same men. While the practical men will be inclined to make fun of the theories of the scientific men, if you will look back over the history of dairying in this country and the United States, you will find that a great advancement of dairying has been first outlined by the scientific men. Dr. Connell does not pose as a practical man, still I do not suppose there is a man who has done more for the practical cheese-maker in this country than has Dr. Connell. President Creelman brought before you forcibly last night that every man needs to be an experimenter to a certain extent. It will probably cost a little money, but it will well repay you, and I want to ask for your co-operation during this coming year. I do not think we have enough co-operation in connection with our dairy work. There is too much petty jealousy; too much rivalry in it all—the feeling that some man has got stuck on himself. This country is too big for this petty jealousy, and we ought as far as possible to co-operate in work of this kind. I would like to know of half a dozen bright fellows who would undertake a few simple experiments along the line I have been speaking of. (Applause.)

Mr. Dargavel: This is cheese-makers' day, and this session is for cheese-makers, and I am sure that after the address we have heard from Prof. Dean, who is so well qualified to give it, that there are many points on which you would like further information.

Mr. Macpherson: What is the best method of determining the amount of moisture at a given period of acid development?

Prof. Dean: We have been making some very careful experiments on the question of the relation of moisture to acid, but at the present time I am not prepared to offer an opinion. I must ask you to allow us to work two or three years longer. The only practical method I know of at the present time is to weigh out a given body of curd in a dish, and put it into some drying oven for six hours, which will take you probably ten minutes to weigh, and then duplicate the sample.

Q.—What is your opinion of using less salt?

A.—We have tried that plan, and I am not prepared at the present time to give an opinion in reference to that. Salt expels moisture, and if you have less salt there is not so much moisture expelled from your curd. It is possible that some of our cheese-makers have been using too much salt. I think from a pound and a half to two and a half pounds for 100 pounds of curd is all that should be used. I think one of the causes of these hard, dry cheeses is the use of too much moisture.

Q.—In reference to the amount of moisture left in the cheese, what difference would it make in ordinary condition of curing cheese and cool curing?

A.—From the work we have done I would advise curing cheese at the lowest possible temperature. You will not get satisfactory results by lifting this curd with an excessive amount of moisture and cooling them at a high temperature. Dr. Connell will tell you that the organism which produces bad flavor will develop and the extra amount of moisture is favorable conditions for their development; and if you are going to leave in more moisture you should cure your cheese at as low temperature as possible.

Q.—Have you any experience of paraffining cheese?

A.—Yes, but this is a question I prefer not to deal with, as Mr. Ruddick has had more experience in paraffining cheese. It certainly keeps the moisture in the cheese.

Q.—Do you put the cheese in the cool curing room right from the hoops?

A.—We find the best results are got by taking the cheese out of the hoops and putting them, as soon as possible, into a temperature of 40 degrees, although we have found very little difference between putting them in at the end of the week as compared with putting them in directly from the hoops. We have been told by many men that in the fall of the year if you put the cheese out of the hoops into a low temperature your cheese will be spoiled. Now, in September we made three cheese out of ordinary milk. One of these was put into an ordinary curing room at a temperature of about 60 degrees, the other into a temperature of 40 degrees, directly from the hoops, and the third was put into an ordinary room at 60 degrees for a week, and then moved to a temperature of 40 degrees, and left there for six or seven weeks. These cheese were scored by Mr. Barr and Mr. Waddell, and they were then shipped to Montreal and scored by Hodson Bros.; all of these people scored the cheese put directly from the hoops into the cooling room 3 points higher. The sooner the cheese gets into a temperature where the conditions are unfavorable for the development of bad flavors the better will be the quality of the cheese. With perfect milk it is all right to use a high temperature, but perfect milk is seldom got in our cheese factories.

Q.—Would it be safe to increase the moisture in the cheese with the average milk we get from the factories?

A.—I am not advising any cheese-maker to radically change his methods. It would be better to make a few experiments, and see if it is possible to improve the texture of the cheese. That is where I think the improvement will come—in the texture. I think there will be a tendency to develop bad flavors if you ripen these cheese at a high temperature.

Q.—Cheese cure more rapidly at a high temperature?

A.—Yes. I think there is a misconception with reference to the question of temperature in the ripening of cheese. We have found by chemical tests that the rate of ripening after an initial period of four or six weeks proceeds at about the same rate at 40 degrees as it does at from 60 to 70 degrees. For the initial period of from four to six weeks there is a difference, but after that the rate of ripening proceeds at about the same rate.

Mr. Macpherson: Those kept at lower temperature will not evaporate as much moisture as those kept at a high temperature, and the amount of moisture will determine the condition of the cheese at a later period.

A.—The difference is only 3 or 4 per cent. If there is sufficient moisture for these ferments to work I do not think there would be so much difference, for the cheese evaporates so much moisture that there is not sufficient for the ferments to work; it would make some difference.

Dr. Connell: There is no question at all that if there is sufficient moisture at a high temperature there is a slight difference in the rapidity of the ripening, not more than 3 or 4 per cent. At the lower temperature the more moisture is retained will not hasten the ripening process. They may start off with the same amount of moisture in it, and at the end of four or five weeks there will be more shrinkage in that kept at the higher temperature. It is not the evaporation of the moisture that makes the curing faster.

A Member: In my section they are getting quite up-to-date in the cheese business. Three years ago we built a large cement factory, with solid cement walls, and we found our cement curing room was not sufficient to carry out

our design, and last year we adopted the Government method of lining our curing-room on the inside with three thicknesses of lumber and three thicknesses of damp-proof paper and filling up the six-inch space with shavings. We thought that would be sufficient for an ordinary cool-curing room, but we found that our cheese moulded considerably, and this fall I got the curing-room down to about 45 degrees—I do not think it went over 48 degrees after the first of September—and I made a much better cheese. I have had the closest and best texture and finest flavored cheese I ever turned out. I made 80 cheese for my patrons and they took them all. I think if we make suitable cheese that the people of this country will eat just as much as they do in the old land. I advised my people to put in an ice chamber, and they did so. I offered my people that I would guarantee if they would put in an ice chamber, and if they would give me the difference there would be in the shrinkage I would pay for the ice chamber and furnish everything complete. I guess they thought there was something in it, and they decided they would do it themselves. I do not think there is an owner that will ever be a cent poorer for introducing that kind of thing in his factory. (Applause.)

Q.—Can you tell us something about the steel whey tank?

PROF. DEAN: We have had about ten years' experience with the steel whey tank. I went to Goldie & McCullough, of Galt, and ordered them to cut a boiler in two, and we have used it for ten years, and I do not think there is any form of whey tank that is equal to the steel boiler. It must be eight years ago that I recommended that and some of you fellows laughed at me.

Q.—How often do you clean it?

A.—Our patrons do not take the whey back. We sell it to the farmers, and therefore we do not have to give that special attention that we would have to if the patrons were taking it away.

Q.—Have you had any experience with whey tanks made of steel that you have to put in the ground?

A.—I would never put a whey tank in the ground.

Q.—In some cases we have to, our factories are not built high enough.

A.—You could use an injector. We run it out of vats into a small tank, and then have steam pipe connection and take the injector to raise it right up into the vat.

Mr. EAGER: What is the cost of that steel tank?

PROFESSOR DEAN: Ours is only a small one. It cost us $40. It is 4 feet in diameter and 6 feet high.

A MEMBER: I asked a firm the other day for the price of a tank that would hold 1,500 gallons and they quoted that sized tank at $110 f.o.b. Belleville. It was a quarter inch steel plate.

A MEMBER: I do not think you can get an injector large enough to take the whey from three or four vats into a small vat?

A.—Why not have two injectors?

A MEMBER: I do not think any two injectors could do it.

PROF. DEAN: Get three, then. You can put an ordinary injector in your coat pocket, and if the injector is not satisfactory you can get a pump. We lift all our skim milk with a pump. It has capacity of 8,000 or 10,000 pounds per hour.

A MEMBER: We have in our own factory tanks in the ground and an elevated tank, and we have built over that tank a square building with a roof, and we have an injector that runs away from the lower tank to the upper tank, and that gives us the best satisfaction. You will not find any stink in our factory, and we take in 20,000 pounds of milk in the morning.

PROF. DEAN: How do you clean this tank that is in the ground?

A.—We pay our men to do it; the tank is scoured twice a week. We make it a point to have it done.

Q.—How do you get the stuff out?

A.—We lift it out with the injector, and then we scour our tank and clean it.

Q.—What would you think of having a cement tank in the ground?

PROF. DEAN: The objection to the cement is that the acid eats the cement and you soon have a tank that is very difficult to clean. If you can keep you tank that is under the ground clean, it will be all right; but my experience is that where they have tanks under the ground they are abominable things.

Q.—Do you think you can save the whey in a tank?

A.—It should not be saved.

A MEMBER: We have a whey tank built of cement, ten by twelve feet and five feet deep. It was not built right in the first place, and we are troubled a great deal with a bad smell. But last year I undertook to show them how it should be built, and I had the bottom of it made so that it had 12 inches of a slant in all directions towards one corner, and in that corner I had a basin built that would hold 6 quarts, and I had an injector run from the boiler to that so that I could pump that vat out so that there would not be more than 6 quarts of whey left in it, and as soon as the whey is out I force pump the water right into the tank. The sanitary inspector was there this fall from Toronto, and he said it was the best constructed whey tank he had seen this side of Toronto. You would not think there had been any whey in it an hour after the whey had been taken out. The cement work in it is as perfect as it was last spring. That is my experience with an underground whey tank.

SHIPPING GREEN CHEESE.

BY J. A. RUDDICK, DAIRY COMMISSIONER FOR THE DOMINION, OTTAWA.

I would like to say one or two words in connection with the discussion, especially on that part of it which had a bearing on the cool-curing of cheese. I think you all know that we have had some experience along that line during the last five years. I made some rough calculations while the discussion was going on, and I found we have handled 15,000 lots of cheese in the cool-curing rooms, all more or less different because they were made in different factories and on diffeernt dates.

Regarding the question of moisture in these cheese, I want to say that the only advice we have had to give the factories in connection with that was to leave less moisture in the cheese. We had more difficulty with too much moisture than anything else. We had to refuse some cheese because they contained too much moisture. Cheese that were made to withstand high temperatures retained so much more moisture that it made a very material difference. I found that a large number of cheese, as we receive them from the factories, contained sufficient moisture, and some of them contained too much; and I have noticed that where they contained too much moisture there was a danger of the ends becoming soft and some lots did go that way.

PROF. DEAN: Did you actually determine the moisture in these cheese?

Mr. RUDDICK: No.

Prof. DEAN: Be careful; that is all.

Mr. RUDDICK: I am speaking of the experience we had during these four years, and that was the only difficulty we did have, that some of the factories left too much moisture in the cheese. It is important that the cheese should be put in at a low temperature as soon as possible, but if you do that and take the cheese directly from the hoop, and put them into the cool-curing room, where there is a high relative humidity, you will have more or less trouble with mould on the cheese, and sometimes there is a tendency to develop soft rinds. We have found it was a decided advantage to have cheese dry on the surface. I think it will be advisable to have sufficient shelf room to carry one day's cheese at ordinary temperature where the air will be much dryer and then put them in the curing-room the next day. During the last three years we have had the cheese delivered to the curing-room the day after they were taken out of the hoop, but I would not leave them longer than that.

I have been investigating a little as to the development of our exporting of cheese, and I have learnt that the first lot of Canadian cheese was shipped to Great Britain in 1866. Therefore we have been forty-one years developing this export business. The first lot were shipped from Canada by the firm of Brown & Gillespie of the city of Hamilton, Ontario, and it was from that small beginning that our cheese trade has developed. For the first few years, till our cheese trade had become established, the merchants in Great Britain sent over to this country their agents, and other firms in Canada took up the business. For many years the cheese buyers travelled around the country and bought the cheese, and those were pleasant days for the cheese buyers because, if there was a sudden rise in the market they were able to get around and buy a lot of cheese before the cheese-maker knew of the increased price.

After that we had the development of the cheese boards, and I believe they have done a great deal for the cheese industry in Canada. Within the last ten years the business of buying cheese seems to have changed; the initiative has been taken by the merchants in Montreal, and Montreal is becoming the central cheese market of the world. There is more cheese handled in Montreal than in any other single locality in the world. All our cheese going over to the Old Country is distributed at various points over there. The merchant in Montreal has been in the habit of buying cheese in this country, and then offering it over the cable to customers on the other side; but it looks as though the latest phase of this exporting question means more or less confidential relations between the firms on this side and the other.

It was stated here this morning that it would be a great advantage to the cheese industry if cheese were sold and bought directly on their merits. That is a self-evident fact. We can easily recognize how that would be, but to bring that about is not quite so easy. It is easier to discuss these things than to put them into effect. The statement is made that the cheese is all bought at the same price, but while cheese are nominally sold for the same price on certain boards, they are not all paid for at the same price; there is a very great difference. I know some factories that regularly get a quarter of a cent above the highest market price in the locality. It is not very generally known, but that is so. I believe there are certain factories, I could name one or two, the produce of which sold for one cent a pound in the Old Country above the average price of Canadian cheese, simply because these factories, after three years of careful, persistent work, established

a reputation which enables them to get this higher price. The reputation for making a good cheese is not won in a single season. The fact that you made good cheese this year and indifferent cheese next year will not give you a reputation. It takes years of constant, uniformly good work in order to acquire a reputation that is of any value. Therefore, I say that there is a very great difference in the cheese which is brought from the various factories over their cheese when the whole transaction is finally closed. It was suggested that official grading as they have it in New Zealand would overcome that difficulty. The matter of grading would not have anything to do with it. The system of grading as followed in New Zealand is a question affecting the management of large factories. They have a regular board meeting, and everything of that kind is brought to the attention of the management at once. If there is any trouble with the quality of the cheese or butter, the management know all about it. You heard Mr. Publow explain how certain factories were being cut in the quality of the cheese and the president and others knew nothing about it.

What I intended to speak of particularly was to refer to this question of shipping green cheese. During the last two or three years we have made a very marked advance in the estimation of the cheese consuming public in Great Britain, and there has been heard nothing but praise for the condition of Canadian cheese as landed on the British market, but I wish to assure you at the present time we are threatening this reputation of ours very seriously indeed by shipping green cheese. (Applause.)

I will read one or two of a large number of letters which I have received from leading importers on the other side. Messrs. George Wall & Co., one of the big companies of Great Britain at the present time, say:—

Liverpool, Dec. 12, 1906.

Mr. J. A. Ruddick, Ottawa, Canada:

Dear Sir,—We have for some time intended writing you on the quality of this season's make of Canadian cheese. Of course we know that your chief interest and ambition are centered in the progress and good name of Canadian dairy produce, and we consequently feel sure that you will receive any remarks we may make in the right light. We simply make them in the best interests of the trade, and not from any personal motives or from any wish to complain.

As a matter of fact, we think there are few who have so admired and complimented in the past years the progress of Canadian dairy industry, and we have often held up the uniformity of the good quality of Canadian cheese as an example of perfect system and organization. Unfortunately, we have this season had many more complaints than usual, and we think you will consider it in the true interests of the Canadian cheese trade that we draw your attention to this. In our opinion the cause of all the trouble this season is the fact that many of the dairymen have allowed their cheese to leave the factory too green. They may of course think that it is policy to avail themselves of excited markets and good offers, but in our opinion, by doing so they are killing the goose which lays the golden egg.

If all the factories were to make an agreement that no cheese should be sent out before they were a certain age, this would be greatly to the benefit of the interests of the future reputation of Canadian cheese, and it certainly would not prevent buyers when they got excited from making high offers, nor would it prevent the factorymen from accepting such. In delivering cheese too green, the factorymen simply do it to oblige the dealers, and get no thanks for it. They would receive the same price if they simply stated that the cheese could not be shipped according to the rules of the trade until they were so many days older, but instead of doing this we feel confident that this year they must have allowed the cheese to leave the factory in many cases almost as soon as they were made, and as stated above, this has simply obliged the dealer, and done harm in reputation to the maker and the reputation of Canadian cheese generally on this side. Further than this, it has meant what has seldom happened before, namely, that there have been serious losses in weight on many of the shipments arriving. This should not have been the case, and must act in the long run very detrimentally to the Canadian cheese trade.

You know of course that we are largely interested as distributors of Canadian cheese, and on this account we have taken the liberty to make the above remarks to you.

We hope that they will be of some interest to you and that they will perhaps be the means of stopping a practice, which, if continued, will steadily lose all the good name which you and others before you have had so much anxiety and trouble in creating.

Trusting that you are well, and with kindest regards,

Yours faithfully,

GEORGE WALL.

LONDON, 14th December, 1906.

J. A. RUDDICK, Esq., Department of Agriculture, Ottawa, Canada:

DEAR SIR,—When you were over in England you asked us to give you any details in connection with the business of the cheese trade which might be of interest to those immediately connected with the industry.

We have noticed very particularly that cheese have been drawn from the factories very young, and this has produced an insipid flavor. We cannot say that it is what is understood as strong flavor; in fact, it is difficult to define, but it is certainly not conducive to consumption. Of course, we have not the actual experience of putting them on the counter, but it is sufficient for us to know that buyers are dissatisfied, and consequently take a great amount of trouble in selecting something which will have a "cheesy" flavor. It is impossible to explain in a letter what we mean by insipid, but probably your own experience of cheese drawn too soon for use will agree with ours. And there is another side to the question. The shrinkage in weight is large, and enhances the cost of the goods before they are sold here. We can turn to weights of cheese fresh landed where the loss is as much as 7 lbs. on 5 boxes. Now, seeing that the cheese weigh on an average ¾ cwt., this loss means just 1/ per cwt. We have none of these troubles to put up with from New Zealand, because they make us a shrinkage allowance of 2½ to 3 per cent. It is no use of our preaching to operators on your side, who are very often gamblers. What we want you to do is to use all possible influence with the factorymen to withhold selling any cheese that have not been made ten days, as we on this side get fearfully punished when handling such young cheese.

Regarding shipping, we have very little fault to find, as the steamship comapnies have made every effort to fall into line, and adopt suggestions thrown out by importers, and as a consequence, we have a better state of things existing now than has ever been known previously.

Yours truly,

ROWSON, HODGSON & CO., LTD.,
ARTHUR J. ROWSON, Director.

The merchants in the Old Country place just as much stress on things like that as he does on a matter of quality. They seem to make a great deal more of fuss over a matter of a loss in weight than they do over a difficulty in quality. They do not like to be imposed upon, and they, therefore, trade with the goods from those countries where they have the least difficulty to contend with. I know it was a practice, when I was in New Zealand, that in weighing cheese they made an allowance of 3 per cent., because they recognized that these cheese were a long time before they reached the other side, and it did not make very much difference because the bulk of the cheese was then sent on consignment. We have also letters from Hodson Bros., Liverpool; Lovell & Christmas, Ltd., (Incorporated with Geo. Wall & Co.) Liverpool; Rowson, Hodgson & Co., Ltd., London; Hodgson Bros., Liverpool; Carrothers & Co., Liverpool; Eben Thomas & Co., Liverpool; Matthew Hudson & Sons, Manchester; W. A. McKnight, Liverpool; George Fletcher, Liverpool; The Colonial Produce Co., Bristol; Pullin, Thomas & Slade, Bristol; Spear Brothers & Clark, Ltd., Bristol; Willer & Riley, Ltd., Manchester; Jas. Smylie & Sons, Manchester; George Little, Limited, Manchester; Wall & Co., Ltd., Manchester; Pearson & Rutter, Ltd. All of these firms deal largely in Canadian cheese, and they point out that it is a very

serious menace to the Canadian cheese trade. I do not know that any more serious menace has occurred to our cheese for many years. It seems too bad that when we have succeeded in reaching a high standard on the market with our cheese that we should have this difficulty to contend with. Let us see who is to blame for this sort of thing. I know and feel that customers on this side are to blame somewhat for offering to buy such cheese, but I think the responsibility exists more laregly with those who have them to sell. It does not make much difference to these gentlemen whether the reputation of the Canadian cheese trade is injured or not. It would not make any difference to them if the whole business went to smash because they would go into something else, and probably make more money than they do to-day; but it is your own business, and if you do not protect it you need not look to Montreal merchants to protect it. The factory men who have control of these cheese should refuse to sell them until they are in proper condition and until they reach the highest value, because green cheese has no real value. If you will not protect yourselves you need not expect outsiders or men who are interested in another phase of the question to do it for you. It does seem to me to be a very unwise policy to sell cheese when they are only half made. A cheese that comes out of the hoop and only two or three days old is not a cheese; you cannot tell anything about the quality that it may have later on. It may develop objectionable flavors, which may lessen its value very considerably. I know that Mr. Publow has expressed himself on that point to me. He has gone into the factories and found no cheese on the shelves, and I say that this custom of selling the cheese too green is a very foolish and unwise policy, and it is a great handicap to the cheese makers. You may say it is an advantage to the cheese-maker to get the cheese out of the factory and save the risk of having them go wrong. But do not make any mistake, if these cheese go wrong in the hands of those who have bought them, on the assumption that they are right, it will come back, in the end, to the man who produces the cheese, and it will go right back to the man who produces the milk: and I would like to have that idea of responsibility until the cheese are consumed fixed more firmly in the mind of the farmer. It does not rest altogether on the management of the factory. It rests very often with the men who produced the milk, and if you continue doing this sort of thing the price of cheese will be that much less. Do not make any mistake about it. There is a narrow margin in handling cheese, and if any losses occur later on it will come back on the man who produces the milk.

Another reason is that the cheese-maker is not able to follow his work and determine whether he is making his cheese right or not. No cheese-maker can tell very much about the cheese when only two or three days old. Every progressive cheese-maker should watch the character of the cheese he is making, and if he finds they require more moisture he gives it to them. But when the cheese are sold in the green state he is not in a position to do that. The cheese-maker naturally likes to get rid of the cheese because he thinks in hot weather they are liable to go off flavor if kept in the curing room. The remedy for that is simply to provide a proper temperature in the curing-room. If you have a proper temperature in the curing-room there is no urgency for getting these off your hands.

I have spoken so often to this convention on the subject of cool curing of cheese that I find it somewhat difficult to say anything new on that subject. Our experience during the past year confirms our results of previous years, and I want to draw your attention to one particular phase of this question which I think is worth noting. Last summer I had about a hundred small

cheese made weighing ten to fourteen pounds. They were just ordinary cheese, no special selection, just common first grade cheese. They were placed in the curing-rooms, some at Woodstock and some at Brockville. They were left there all summer at a temperature of 58 to 60 degrees. There are two of them on the platform at the present time and we will have them cut up. I do not know what temperature they have been kept at during the last few weeks, but up to the end of the cheese season they were in the curing-room at a temperature of 60 degrees. They were paraffined ten days after being made. These cheese have been sold to various parties who like a nice piece of cheese, and I have heard so much satisfaction expressed over the quality of the cheese; they have developed that nice cheesy flavor, which is so much in demand. And that brings me to say a word or two on this question of curing at extremely low temperatures. I am quite prepared to admit that if you will select a large number of cheese and place some of them at a temperature of 40 degrees, some 60 degrees and others at ordinary temperature, some of these cheese will turn out better flavor or cleaner in flavor than some of the cheese cured at 40 degrees. But what I want to impress on the mind of the cheese-maker is that we often call good flavored cheese anything that has not a bad flavor. Such a flavor may be insipid, having no particular quality. Absence of bad flavor is not high water mark in cheese, and I am afraid we do not develop that high cheese flavor at extremely low temperatures. I believe we get near the standard when we cure the cheese at about 60 degrees. The cheese made in the old country sell for a cent and a cent and a half above the average price of the Canadian cheese. They are kept in the curing-room for three or four months. When I was in Scotland in August, 1905, I saw cheese made in April, May, and June on the shelves in the factories kept at a temperature of about 60 to 65 degrees. They have better milk than we have to deal with. There is an absence of bad flavor, and they have a real cheesy flavor. That is what I find in these particular cheese that have been cured at 60 degrees and held at that temperature four or five months. I am afraid we have been losing sight of the importance of this cheesy flavor which is necessary if you want to demand the highest price. When a green cheese is offered to a customer in the old country they say it is not bad cheese, but they do not want it. They do not make any allowance for its being green. They want cheese more or less developing that cheesy flavor. If we ship our cheese out from the factories, put them into the refrigerator cars, carry them to Montreal, and put them in cold storage on the ships, and have them held on the other side in cold storage, we will have that objection made that they are insipid, they are not cheese at all; they will not recognize them as cheese. I think it is too bad after we have attained the standard that we have that anything of this kind should come up, and I want to leave that point with you. It is a matter which every man who produces milk should take into account and should consider fully, just as much as those who are in charge of factories. I would like Mr. Publow to take charge of these cheese and have his instructors examine them closely, and let me know what they think of them. (Applause.)

The Chairman: I think it is acknowledged by every owner of a factory and the patrons that it is bad policy to ship green cheese. I would like to know what plan Mr. Ruddick would suggest to remedy this—whether by education, legislation, or damnation. (Laughter.)

A Member: I do not like to see the blame going on the salesmen, for I do not think the salesmen are responsible for shipping these cheese. I am pleased to see that we have here merchants from Montreal. They have agents coming right into the cheese factories, inspecting cheese, and they will say,

"If you would like to ship that cheese to Montreal I will give you so much." And I think the blame is on these men who buy the cheese. (Applause.) We are always anxious to get the top price, and we are always afraid the market is going down, and when an agent representing a big firm offers a good price we do not like to refuse. (Applause.) Merchants in Montreal are to blame for allowing these green cheese to be shipped.

Mr. RUDDICK: I said before that I considered the exporter very much to blame for encouraging the buying of green cheese, but I say the responsibility rests on the man who owns the cheese. If you are going to allow the Montreal buyers to run your business then let them run it, but you will suffer in the end. It would be a great deal better to refuse to sell them these cheese. (Applause.) The Chairman asks what is the practical remedy? You have simply got to recognize that it does not pay to do this sort of thing.

A MEMBER: Some years ago some of the Montreal firms gave instructions to ship the cheese in right from the hoop, and I would like to know if you can give me an explanation as to the reason of the change. Have they found out they made a mistake in buying these cheese?

Mr. RUDDICK: Yes, I think they have.

ADDRESSES BY MONTREAL CHEESE MERCHANTS.

Mr. A. HODGSON: I represent the Montreal Merchants' Produce Association, and Mr. Wieland follows me. We were both sent here to have a talk with you. The President would have been here were it not that the election is going on, and they are busy.

I have been in the business for thirty-two years, and I visit different parts of Canada. We want to meet the producers. Your business is to make cheese, and our business is to buy and sell them, and we are told frequently by farmers: "If you do not take it at so and so, somebody else will take it and pay more." Cheese frequently is shipped that is only eight days old or just out of the hoop. During the last two years a good deal of experimenting was going on with reference to the cool curing of cheese. It was thought that if you took cheese into a warehouse and kept it there, that that would be cool curing cheese, and they would come out all right. We are willing to trust ourselves as exporters pretty much in the hands of Mr. Ruddick or Mr. Publow, and at any time these men want to come into our warehouse they are welcome, and if they find anything wrong we are willing to take their advice.

This referee question was discussed by our association, and we have left it in Mr. Ruddick's hands entirely and in your hands. If you want a referee you will get one, and if not, you will have to take our inspection. But you can send Professor Publow down there, and if he says we are right you will have to pay up, and if he says we are wrong we will have to pay up. We have always given way to Mr. Woodward, and have done just whatever he said. If your President will write to Mr. Stanley Cooper, our Secretary, he will give you any information you require. I wish to say that we want to co-operate with you in this matter, and if you say you do not want a referee we are willing to take that position.

I congratulate you upon the high price that was obtained for cheese last year. We started the year short of cheese, and we started high, and kept right through the whole year. Some of us have cheese left yet, and we hope we will have a 14 cent wind up. We are also hoping for high prices

next season, but that depends upon your paying attention to the instructions you have had here at this Convention. I was pleased with one thing all through the speeches, and that is that we have to have a high ideal. Keep that high ideal before you. You may think the standards are kept too high, but those are not a bit higher than they ought to be. Our association has accepted the standard arranged by the Dairy Commissioner. A man does not require much exertion to go down, but you have to work in order to keep up. If you want a high standard of quality in your cheese you must send a high standard of milk. I want to thank you for the kind invitation sent us, and to say that the Montreal Produce Merchants' Exchange is ready at any time to co-operate with you and do what we can for the benefit of the Association.

The CHAIRMAN then read the following telegram from A. A. Ayer & Co.:

MONTREAL, QUE., Jan. 10th, 1907.

J. DERBYSHIRE, *Eastern Dairymen's Association, Ottawa*:

Regret that circumstances prevented my attendance. Permit me to say that in my opinion cleanliness and proper drainage at farm and factory and creamery, together with efficiency of makers and buildings, should be the forward movement in Canada this year. Could not the Government through the head instructors take control of above and issue licenses of first, second and third class? Many farms, factories and makers are first-class, but inferior ones are lamentably numerous. Hope your Association will lead on these important questions.

A. A. AYER & Co.

The CHAIRMAN continued: I am very glad to see the reference to licensing of factories, a project brought forward at Belleville three years ago. We cannot induce the Government to take it up as a Government measure. This year we had a couple of sanitary inspectors appointed who did good work, and I believe we are working towards the licensing of factories, and we will practically have it this coming season.

Mr. WIELAND: I think the main evil that has crept into the cheese trade and into the dairy industry is that you are actually selling goods under false pretences. That is, you are not selling cheese; you are selling curd. I do not think any cheese-maker would describe the cheese he takes down from the hoop on Saturday and sends to Montreal on Monday as cheese. Some man in the audience said, if we are offered a good price for this stuff we cannot be expected to withstand the temptation. You might say the same about selling cattle, and if a man thought a calf was a cow he would sell it to him for a cow.

I represent a firm in Manchester that has a capital larger than the Bank of Montreal. They did a business last year of $108,000,000, and I want to point out to you where you are going to lose business. The Canadian cheese which we handle amounts to four hundred thousand pounds sterling, (in the neighborhood of $3,000,000), and if they do not get the goods they want, they will buy elsewhere.

In 1906 I was in our cheese room in Glasgow, and I saw cheese that had never seen the inside of a cold storage. It was cured in the usual curing house in Scotland at a temperature of about 55 degrees, and that cheese was very fine. One of the greatest necessities in this business is cleanliness, and I believe that predominates all Scotch dairies.

A country from which you have taken a great many good leaves is Denmark. Surely Denmark has no more right to claim perfection than any other country. When they started in the dairy business they found that Ireland

had the butter trade, and they had to capture it. It was not presented to them; they went about it in the right sort of way, and they got it. They have surprise inspections. A dairy may be visited in the middle of the night. Their butter ranks very high. The only things Denmark wants to bother with is butter, bacon, and eggs, and at the present time Canadian bacon is ranking very close to Danish bacon. I believe the vast majority of Canadian farmers would rather do a thing right than wrong, and you should adopt such measures that the minority will have to come in. You may call that compulsion, but I think you should have it.

We have had a great many complaints this last season of the cheese running off very quickly. We expect to lose on an average one-half pound per box per month on our cheese, and if we do not lose more than that we are perfectly satisfied; but when you carry a cheese two or three months and lose two or three pounds a box, it is a great loss at 13c. a pound. The quality of the cheese this season has been fair; the flavor has been clean, but it does not seem to give perfect satisfaction. You examine it and say you cannot find any fault with it, but they do not exactly like the flavor. It lacks a cheesy character on which they lay a great deal of stress on the other side. If you do not keep up the quality of your cheese the Englishman will get something to take its place. The principle will always hold good that the man who does not put up a good article will surely lose his good name. (Applause.)

The Chairman: No man in Canada has done as much for the dairy man as Professor Robertson, and I would like to have him say a few words to you at the present time.

Prof. James W. Robertson: It is very pleasant for me to come back after missing several years of conventions, to listen to the most interesting discussion of you men who are carrying on this business. Changes must come as time passes, but I find no change in the hopeful spirit of your President—and the next convention is always the best—and this has done much for Canada and for dairying. You may have heard of the English dairy maid that turned the milk sour by her smile. She must have had a very cross disposition. I have known men who kept back great national movements by their hopelessness and pessimism; by their want of faith and expectation; but I think Mr. Derbyshire, by his hopefulness, has helped the dairying business a great deal. Since I was at the first dairy convention thirty years ago, there has not been a great deal of change in the disposition between the buyer and the seller. It comes back to me that no man liveth unto himself, even in the cheese business. We must all hang together or we must all sink down together; and every cheese buyer who does his duty well, and every cheesemaker who does his duty well, and every farmer who does his duty well will help on the progress of this great industry. If a man makes only a mouse trap and makes it better than any other man in the world, then the world will come from every quarter for that mouse trap. A few years ago Canada began to turn out the best cheese in large bulk that went to Europe, and then the largest ships plowed through the sea to our shores to carry our cheese to England; and then they built larger ships and faster ships and they plowed a wider path to our shores, and now they are travelling a beaten path to Canada. Why? Because she has the reputation of having a climate and a people that make some things the best of their kind that the world needs, and that kind of service will always have recognition. We cannot grow wheat as easily in the North-west now as we did in the beginning, because they are getting weeds out there, and it is the same in the cheese business. We are getting more troubles than we formerly had. I welcome

the Dairy Association to the enjoyment of the splendid reputation which has opened up, along which hundreds and thousands of people travel the seas to this land, and we can rejoice in having had a large share in bringing millions to this country. (Applause.)

The CHAIRMAN: Prof. Robertson is here because I went down to Ste. Anne and invited him. I talked the matter over with him and showed him that he must not lose touch with the people in this part of the Province. We can all remember when they would sneer at Canadian cheese, and when we sent 8,000 or 15,000 boxes from Montreal, and New York was sending 130,000 boxes a week. At that time we got Prof. Robertson appointed Dairy Commissioner, and he took hold of this work and reversed these things, and now we are letting New York send 8,000 or 10,000 boxes a week, and we are shipping 120,000 and 130,000 boxes a week from Montreal of the cleanest up-to-date goods that any country can make on the top of the earth. (Great applause.) Don't you think it is a grand time for me to drop out of this job? My heart warms when I think I have had just even a humble hand in connection with this dairy business. I expect great things from my successor, President-elect Dargavel, and I bespeak for him the co-operation of the dairymen of this country, especially Eastern Ontario. I am sure you will give him your hearty co-operation the same as you have given it to me, and if you do that the progress of the Canadian dairymen will be greater in the future than it has been in the past. (Applause.)

MISTAKES IN DAIRYING.

By Prof. H. H. Dean, O. A. C., Guelph.

If I remember rightly, I have attended every session of the Eastern Ontario Dairymen's Association since I have been connected with the Dairy department of the College, and that is sixteen years. I have enjoyed the work, and I have enjoyed coming to your meetings. I have esteemed it an honor and a pleasure to meet with the dairymen of Eastern Ontario year after year. To one who is tied rather closely to College work it comes as a pleasant holiday to meet with the eastern and western dairymen year after year: in this way we get right views of life. The tendency of the man who remains in one place is to get narrow views of life; but, by coming in contact with men who are actually engaged in business, our views are broadened, and we come to appreciate men and their work at their true value. We profit most by our mistakes, and the man who tells us in a kindly manner that we have been making mistakes will do us the most good.

In my sixteen years' experience as a servant of the people I have had a great many opportunities to join the Echo Lodge of Society, but what we need in this work is men who have backbone. There are a lot of fellows who have a wishbone where they ought to have a backbone. (Laughter.) The man who is going to do his very best in whatever line of work he is engaged must have a backbone.

The first mistake to which I would call attention is that many of our dairymen are wasting their soil fertility, and, instead of giving you my own views on that, allow me to quote from a recent address by J. J. Hill, the great railway magnate—not a college professor, not a farmer, but a railway man. He said in a recent address before the American Congress of Agriculture: "All the people that exist upon this planet, all development of

man, from the lowest to the highest quality, rests as firm and unreservedly upon the capacity of the soil, as does his feet upon the ground beneath. All industry must stop when the products of the soil are not forthcoming to furnish money for the pay roll. The one unfailing national resource, the sole asset, that does not perish because it contains within itself the possibility of infinite renewal, is the soil. The waste of that treasury in America has already deteriorated the value of soil for productive purposes more than it should have done in five centuries of use."

That is what the far-seeing railway man has to say about American agriculturists. If this waste of soil fertility is so great as to strike a man who is engaged in another business entirely, how much more important is it that we farmers should give attention to this great waste that is going on in connection with our soil, everywhere in this country. We find, everywhere, men growing timothy hay to feed cows, and they might as well give straw. I was very much pleased when Mr. Glendenning brought before this convention the importance of growing alfalfa or lucerne clover. I have been making some experiments on my own farm of half an acre with reference to alfalfa. I consider it one of the best plants that the dairymen of this country can grow. I see no reason why the dairymen of this country should not cut the cost of milk production in half, if they will give more attention to this question.

The next mistake I wish to call your attention to is the fact that the average farmer is content with inferior animals on his farm. A man who is content with a cow giving 3,000 lbs. of milk is a man who does not understand the first principles of the economics of dairy work; and, until the dairymen of this country wake up to the fact that it is possible to get cows giving six, eight, ten, and twelve thousand pounds of milk in a year, they cannot hope to compete with the dairymen of Denmark and other countries.

The next mistake, which a great many of our dairymen are making, is with reference to the feeding of these animals. They do not give them sufficient of the right kind of food. There are men so generous that they will actually feed a cow on straw all winter, and then swear at her because she does not give more milk. The winter time, when most of the cows are dry, is the time to prepare for next year's milk production. There is nothing surer than this fact, if a cow runs down in flesh in the winter time she will not be a profitable milker during the next summer. That is one of the fundamental mistakes which a great many of our dairymen are making with reference to the feeding of cows. A great many farmers' cows are so thin in the spring that it takes them half of the summer to recover from the bad effects of the winter. There is another reason, and a very important one, that cows should be fed well during the winter time when they are dry. It has been demonstrated that the effect of poor feeding upon the progeny is very marked, and one of the reasons why many cows are unprofitable milkers is because they were not properly fed when they should have been. This is another of the fundamental mistakes which our dairymen are making.

Now, I come to the man himself. Froude, the great historian, says, "Take man at his best and man is a great fool." I was reading one of those great books of Froude's, and I read this sentence out to my wife, and she said she was glad that some men were able to appreciate men at about their true value. (Laughter.) We hear a great deal of talk to-day about the importance of cleanliness on the farm, and in our cheese factories and creameries. Well, I want to say that, in my judgment, one of the things that needs cleaning up is the men who are in connection with the business, and I consider this habit, which so many of our dairymen get into, of smoking

and chewing tobacco is a disgrace. (Applause.) We hear a great deal of talk about cowy odor in milk. Personally, I would rather smell a cowy cow than a man who literally stinks of tobacco. (Applause.) One mistake which a great many dairymen are making is in connection with that very thing. Whenever I engage a man to work in the Dairy department of the College, I ask him if he uses tobacco, and if I can get a man who does not use tobacco I will pay him more wages than I would the other fellow. I hold that a man who has his sense of taste and smell vitiated and paralyzed by the use of tobacco cannot judge milk and butter and cheese, and, if I had bad flavored butter or cheese to sell, I would like to sell it to a man who uses tobacco.

Another mistake which our modern dairymen are making is in clinging to the old idea that aerating the milk is a good thing. When we preached aerating the milk eight or ten years ago it was as a result of a practical experiment, but we believe now that aerating the milk at the average barnyard does more harm than good. What is necessary is to get the milk cooled as rapidly as possible. It is a source of personal gratification to me that the idea of aerating milk has largely passed away, and that we have, taking its place, the more rational plan of cooling the milk. They are bringing up in connection with the cooling of milk one or two false ideas which I would like to talk upon. A man came into the dairy building last year and said he had a great thing for cooling milk. I told him to send up an apparatus, and he did so, and this is the result: 25 lbs. of ice, 25 lbs. of water and 154 lbs. of milk; temperature of the milk, 98 degrees; temperature of the room, 60 degrees; temperature of the milk after cooling, 84 degrees. It cooled the milk just 14 degrees. I asked our foreman, a good practical fellow, who is not afraid to give a report on anything we turn over to him, to do so, and this is the report he gave: "Awkward to put ice into; awkward to put in and take out the milk; occupies too much space; awkward to wash; not an efficient cooler; conclusion, total failure." There are serious objections to putting the cooling medium into the milk. One is there is great danger, if it be water and ice, that some of this will accidentally get spilled into the milk. There are people who would have an accident of that kind if necessary. There is always the risk of an accident, and then there is the second objection that, when you take it out of the milk, you are going to make a mess of the floor, because there is a certain amount of the milk bound to be running off this cooler, and I think it is better to put your milk into the cooling medium and not the cooling medium into the milk.

Another mistake is that of selling the products too cheaply. Science has demonstrated that one quart of milk contains as much nutritive material for the human body as one pound of beef. If you ask the ordinary man or woman to pay 10c., or 18c., for a quart of milk they would think you were robbing them, and yet science has demonstrated that a quart of milk is equal to a pound of beef. In Guelph we cannot get any kind of beef for less than 16c. or 18c. a pound. My own judgment is that the people of this country are waking up to the value of dairy products as food, and, instead of expecting to get milk for 6c. a quart, they will be willing to pay 10c., if the milk is clean. If the farmers of this country will produce clean and wholesome milk there are any number of people who are willing to pay 10c. or 12c. a quart for such milk, and they will not be paying an extraordinary price as compared with beef or any other food you can buy. I look for the prices of dairy products to be growing higher and higher, especially milk. (Applause.) Milk is one of the most easily digested things the human being can take into the stomach. If you are ill what does the doctor recommend? What does the child live on in its early stages? Milk, because it is easily

digested, contains everything that is required, and it is one of the most valuable foods which we have for human consumption. One of the mistakes which our dairymen have made in the past is in thinking that they have been getting a sufficient price for their products whereas they have not been getting near their true food value. The more we know about dietary science —that is the science of feeding human beings—the more people will be willing to pay a higher price for dairy products. One of the speakers, Mr. D. M. Macpherson, made a valuable suggestion in this connection. We ought to have prizes in connection with every Township and County and every Provincial Fair in this country for the best milk and cream, and the best methods for taking care of that, and I do not think our agricultural fairs could spend money in a better way than by offering prizes for the best milk and cream.

Q.—Why not give prizes at the factory to the man that brings the best milk for a certain length of time?

Prof. Dean: I think that could be done. The man who takes good milk has no encouragement, because he gets no more for his cream than the man who takes in poor milk. I hold that is wrong, and we will never have very much improvement until we change that sort of thing, and encourage the men to produce and care for the raw material as it should be.

Another mistake that I consider modern dairymen have been making is in advertising to the world that we are not taking as good care of our milk and cows as we ought to. A woman made the following remark before the New York State Dairymen's Convention: "We should call attention to the virtue of our product, not to the vices we would be rid of." I hold that this is a sound business principle.

What I have to say just now deals with principles and not with men; and one principle is that the dairymen of this country have not given sufficient encouragement to the men who are engaged in original research, and in helping the cheese and butter business of this country to get on a better footing. Dr. Welsh, at the opening of the new medical building at Harvard, said: "Men count for more than stately edifices and all the pride and pomp of outward life; research is not to be bought in the market places nor does it follow the commercial law of supply and demand." A man, who left one of our great Universities in the old land, said: "What are buildings and equipments if we have not got the right kind of men to look after the teaching of the work." I hold that is true of the dairy business to-day; you may have the best equipment that money can buy, but they all depend upon the men who have to handle them. (Applause.) The tendency is for the public to expect too much of the average college man. There is a tendency to criticize very strongly the men who are engaged in work of this kind. While we welcome fair criticism, when men attack you unfairly and expect things of you that cannot be done by mortal man, a serious mistake is being made. You can never have the highest type of a teacher and the highest type of original research man in one and the same man. It is just like expecting to get a first-class dairy cow and a first-class beef cow in one and the same animal.

In connection with the dairy business in this country we need one chemist and one bacteriologist who will devote all their time to bacteriology and chemistry in connection with the dairy. In every step in the whole process of cheese and butter making the cheese and butter maker will be all the better if he knows something about the chemistry and bacteriology. I hope something will be done in the near future to get more original research done

along the line of dairying, and that whoever they select for that work will receive fair remuneration and be treated as they should be treated.

The CHAIRMAN: I have great pleasure in introducing to you the member for North Perth, Mr. A. F. MacLaren. He has been engaged in the dairy business for a great many years, has been President of the Western Association, and is one of the men who has done a great deal for the dairy business.

Mr. A. F. MACLAREN, M.P.: I must say I am delighted to meet the dairymen of Eastern Ontario, and I am delighted to see the rapid strides that have been made in the dairy industry in the Ottawa Valley during the last ten years. I very well remember ten years ago when I was first asked to judge cheese at the Ottawa Fair. I did not think very much of the exhibit, but during the last two or three years, I see a very great improvement, not only in quantity but in quality. I think you ought to be proud of Mr. Derbyshire, your President, for the manner in which he has held this Association together, and I am sorry to know that he is retiring from the position, because it will be hard to get a man with such long arms to hold you together. He never came up to our part of the country without praising this section, and the County of Leeds was always on his lips. I think he will acknowledge that he received many good lessons in the West. I think we are making a mistake by not mingling more with one another. I think you should have larger factories in the east than you have. It would be better to put two or three small factories into one, and then you could make fifty cheese almost as cheaply as you can make ten. I think you would make more money if you had larger factories.

Another thing I was impressed with was what Prof. Dean said with regard to running down our own milk and cheese. I happened to be in Edinburgh when the report of the meeting in Montreal about bad milk came out, and one remark was that one man would not eat his own cheese, and I heard a very hot discussion in Edinburgh, with regard to that very article. I sent a copy of the *Scottish American* to our head inspector in Western Ontario, but I never heard any more about it; but I thought it was a very bad thing, and it happened at the very time when there was all that objection about canned meat. I happened to be in Germany and Austria and France when all that agitation was going on, and in Scotland and England, and many stores where I inquired they told me they had stopped almost altogether selling canned meats on account of the bad reputation it got, and I thought it was a very bad time to say anything about Canadian cheese.

I also agree with Mr. Dean when he says the time for cheap milk and butter and cheese has gone by. I think, as long as you keep the quality of your milk up, you will never again see a low price, because people are getting better pay, labor is getting higher, and they can afford to pay for quality. You make a great mistake in allowing your cheese to be shipped too green. (Applause.) In one place in Scotland, at a little village called Kenmore, I used to go into the store every day, and I was ashamed of the Canadian cheese I saw there, because they were dry and chippy and hard and green, and not fit to be shipped from Canada. On the other hand I found plenty of magnificent cheese from Canada, but the great trouble with most of our cheese was that they were too dry and harsh. If you make your cheese fat and rich in flavor you can sell them. I would strongly advise making soft cheese with more moisture, and have it retain its flavor by curing in cold storage, and then you will advance the name of Canadian cheese. (Applause.)

I was on my way to Carlsbad, and I read in a book about a great professor, Karl Von Nourden, the greatest dietetic doctor in the world, and I went to see him. I took the train at Cologne, and sailed up the Rhine. I called up the Doctor by telephone, and he said, "I am leaving the city, but I will be here for two or three minutes, and if you will take a carriage and drive up I will examine you." The first thing he did was to ask me where I was from, and I said, "from Canada." He said, "What is your name"? I thought I was in for it then; I had to acknowledge my name was MacLaren. "Well," he said, "You are not the cheese man?" and I said I was. I was very much surprised, after getting through, when that honest German doctor only charged me the nice little sum of $7.50. I expected it would have been $500.

FIRST PRINCIPLES IN DAIRYING.

By Dr. Jas. W. Robertson, of Macdonald Agricultural College, Ste. Anne de Bellevue.

It is pleasant again to come before men with whom one has worked so many years, and it is pleasant to be able to hope that the calamity that may overtake our dairy business, is far in the future. It was once very cold on this spot. One of these scientists, who works for the Dominion Government, said that not so very long ago this spot was covered by 2,000 feet of ice. He did not add the inches, but I am quite sure about the 2,000 feet. Then by and by cold storage was a thing of the past. It was a tradition of the people, and then there came that matter of cooling off things by the water process, and it may be possible that this spot will again be covered by 2,000 feet of ice.

It is only a few years since I was here before trying to satisfy myself that I had something worth saying to you. These conventions are instructive; they bring us information which becomes an instrument in our hands and our minds for further domination or supremacy over the material ends we control. More than that, these conventions are good in other ways. The best thing that a convention can do for the people is, not to increase the crops, although that is good, not to increase the products, but to increase the thought power of the people. The destiny of Canada depends upon the thought power of its people (applause), and you who are following dairying must think of increasing the thought power by which you manage your own business and help on the affairs of state.

Since my friend, the President, is about to retire, I would like to take time for one or two sentences to tell you my appreciation of the capital work he has done for Eastern Ontario and the Eastern Townships, and regions far beyond these places I have named. (Applause.) It is not every man who would give all his time so unselfishly as Mr. Derbyshire has. It is not every man who has the enthusiasm that can light up into activity, the dormant powers of other people. I would rather be a small rush tallow candle, that would light up the soul of some small boy sometime, than be an electric light by itself that would dazzle people's eyes. Wherever you go you will find men of various kinds all speaking well of our Dan. (Applause.) He is just a little more than a man; he is a dairy institution, conserving in himself much of the pleasant history of this Association, embodying in his own personality much of what it has done for the farmers and cheese and butter makers and shippers of Ontario, and leaving behind him in his chair

traditions which, I believe, his successor will worthily try to improve upon, because he is also a man, and we expect improvement in his successor. I say we are sorry to part with Mr. Derbyshire, but glad that the Association have enjoyed his *regime* so long with so much good to themselves. (Applause.)

We measure progress sometimes by mile stones. I go away back to the time Mr. Ruddick spoke of this afternoon, when the first cheese was shipped from Canada—away back in 1866, when the shipments were sent mainly in old flour barrels, for at that time these were the cheese boxes. I knew men who shipped cheese in flour barrels for many years, and I have sold cheese to them and made cheese for them. The exports of cheese and butter in those days were very small, in all $2,000,000—chiefly butter. By 1876, the value of our exports had risen to $4,000,000. Then there was a conspicious mark of progress when our dairymen went down to the big Centennial in Philadelphia and showed their goods, and I think you will remember how creditable the showing was to these people, and how much encouragement they got. My friend MacLaren was one of the unpaid instructors in those days. I remember him coming to the factory in which I made cheese and telling me some things that were helpful to me and valuable to me. (Applause.)

Then in 1886 the exports had risen to about $6,000,000. At that time there was but one Provincial dairy instructor. I was appointed to the chair in the Ontario Agricultural College. That was fully twenty years ago, and I begin to feel that I should not be longer a boy. The exports of butter were then about $6,000,000. Then in 1896, the value of cheese and butter had come to about $15,000,000, and in the next ten years, 1906, the value of butter and cheese came to about $30,000,000, so you see the tremendous progress of quantities, and some corresponding progress in quality, in ability, in reputation, and in revenue.

I want to say a very few things about some of the first principles in dairying that need to be our standard, that younger men may be encouraged to try their best to make a success of life in dairying. The first principles with regard to this business are very much like those in all other occupations. Some men think that in time you can get something for nothing. It is all right, but that is one of the besetting sins. Man never creates anything unless it can be said he makes a fool of himself. (Laughter.) He never can entirely create anything, but to him is given a large measure of controlling, of shaping, the forms of things, and determining the use of things. Every school boy knows that in the conservation of energy there is no waste of energy; that the heat of the sun that puts itself into the corn stalk, or into the wheat end, is not clean waste. It is not man's concern to let the sun play idly; but he wants to so work the land that the sun will have a good effect, and a man's chances can be wasted by letting the sun's heat go to waste so far as he is concerned. The conservation of energy is tremendous. There is a conservation of energy and a ceaselessness of motion. The atom which was once thought the ultimate division of matter has been found to be made up of infinite parts in ceaseless motion. Think of this, and the unsleeping intelligence controlling it all. Love of a man's labor sets the pace for his progress. Let me give you one or two instances of the application in this direction of intelligence. Some years ago it was my happiness to be able to encourage boys and girls in Canada to pick out the heads of the most vigorous plants on their fathers' farms. After three years of working, the heads sent in represented 28 per cent. more crop. That was the direct result of intelligence on the part of the boys who did the select-

ing, and only the other day, a great man, whom I esteem, Professor Hays, Assistant to Secretary Wilson, of Washington, one of the great men of the continent, said, after his long experience and work in this matter, that the crops of America would be increased instantly, 25 per cent. if selected seed were sown with three years' selection behind it. What does that mean, to gather in 25 per cent. more grain, not by doing any more plowing or putting any more fertilizer, but by intelligence through the selection of the seed.

In the Province of Ontario alone there is 5,000,000 of acres sown annually to grain. I should say four-fifths of that is fed to cattle and horses. Look at the tremendous impetus it would make if you get 25 per cent. more grain. Mr. Grisdale has made it clear that 25 per cent. more crop can be got by proper rotation without any more labor. What would not we do in this Province, by way of shouting, if, by any magic we could bring into farmers' granaries $25,000,000 worth of grain in a year without doing anything for it.

When a farmer ships out of Canada a hay crop from 200 acres of land, he has caused to be sent out of this country more plant food than was sent away in our whole $6,000,000 worth of butter. That is a fact. The dairyman who exports butter is a safe man for the land. He makes the land itself a secure storehouse for the enrichment of future generations. The soil is the habitation of myriads of living things. You may say insignificant; but certainly not at all insignificant compared to what I am. The tiniest microbe of the soil is a majestic power compared to what I am. What can they not accomplish for the evolution of making things ready for something better than themselves? That is the meaning of plant population,—the bacteria—in soil, to prepare those obstinate substances so that the tiny, tender, soft roots in plants can get them and lift them up into the sunshine. It is man's part to take care of these small things and let them do their best.

Then there is the question of cattle. These cattle-testing associations are valuable, but they do not go far enough, and that is not complaining of what they do. What does the cow-testing association do now? It excludes the bad, and weeds out the poor; but we must go much further than that and improve the good. I do not care for the man who is all negative. I do not care for these negative people, this negative cheese, these insipid things that have nothing bad about them. They would be all right in their way, but I want a positive thing. I want cheese that is good; that is cured a long time at a low temperature. (Applause.) We want, not merely the absence of poor cattle, that may be brought about by testing associations, but we want the presence of good cattle. It is very difficult to know how to get them, and the only way to do it is by selecting and breeding.

I have now four years' selection of chickens at Ste. Anne's. They lived through this winter in a single board house, 25 below zero, and in their little colony house they get no mashed feed. We have not time to make it for them. They eat snow when the water is frozen, and they do not do so badly. I had six last summer at my house, and they laid an average of five eggs a day all summer, and 250 of these pullets now are laying 100 eggs a day in this weather, and eggs are quoted in Montreal at 70c. a dozen.

Q.—How high is that pen?

A.—It is about 20 feet by 10 feet wide, one door and one window, and a floor and a good deal of straw in it. With four years' selection that is what they do. There is a lot in feeding.

A quart of milk is always worth more than a pound of meat in a house, because it does not require preparation; it is more digestible and all round

better value in every way. A pound of cheese, well made and cured slowly, is always worth 2½ pounds of the best beef you can buy.

I spoke to the nephew of Pasteur the other day, and he had only one thing to say. What the people want is to have the things kept clean. They do not want any pasteurising. It is all foolishness to pasteurise things that can be kept wholesome by being kept clean. There is an old saying that is entirely wrong, "A little knowledge is a dangerous thing." I would rather say, "A little stupidity is always a dangerous thing, but the least bit of knowledge is a wonderfully nourishing and comforting thing;" (applause) and the largest knowledge is only a little knowledge after all. A little knowledge is not a dangerous thing, but a little stupidity is a mighty dangerous thing. Let the boy get a little knowledge about everything, and let him be trained so that he can escape stupidity. How do you train him into that? Let him grow naturally by doing the things that his faculties call for, physical movement, manual labor, manual skill. How often intelligence is instructed by manual dexterity, and the boy who is taught to handle things and to use things is bound to make an active, intelligent man.

How can a man serve all the people? Did you ever think of the only man who served all the people? "Suffer little children to come unto me." There is the possible service,—serving all the people by serving the children who will rise up and become teachers and trainers of children. That is why the work of one man, called Sir William Macdonald, was put largely at my disposal, not to thwart anything, but to support the new institution serving the people in a far richer way. He would like to have a chance to serve the part of Eastern Ontario that geographically lies contiguous to us. He would like to train teachers into ability to carry on school gardens, nature study, sewing, cooking, and housekeeping—teachers who can go back to the schools and teach these subjects. How much do we want for it? Just the cost of what the teacher eats while she stays with us. We do not want any revenue; it is free to every teacher in this Province.

If you go to Ste. Anne's you will find that we have a mile square of ground. The cost of buildings and equipment was a million and a quarter of dollars, and every dollar spent as savingly as Scotch thrift could make it go. We put up buildings worthy of our faith in the future of agriculture. There is not a wooden joist in the buildings; they are all built of steel and concrete and are built to stay. We have the best ventilated college and residence buildings and houses for the pupils and teachers, barns for cattle, pens for the hogs, and houses for chickens. We have not been stinted in it. One job, that I thought would cost $12,000, according to the estimates, cost $5,800. That is all free to the farmers of Eastern Ontario in agriculture and horticulture and dairying and poultry-keeping. You will be as welcome there as the sunlight. You can come to our short course or long course. We have eleven acres of flowers. The glass for our windows cost us $16,000 more than common glass, because we wanted to have clear windows for the pupils to look through. (Applause.) We are trying to increase the thought powers of the people, and I will be very glad if you will come down to see us in the summer time. We have room for 400 now, and we can fit up accommodation for 150 more. Every building was put up with the idea of extension. It is worth while doing these things for the boys and girls. We read the old injunction, "Lay up for yourselves treasures in heaven where neither moss nor rust does corrupt." What do I mean about heaven? It is not some far off region. "Of such is the kingdom of heaven." Lay up for yourselves treasures in the thought power and in the intellectual power and spiritual power. That is where neither moth or rust will corrupt, and

where thieves do not break through and steal. That is where Mr. Macdonald's millions are invested, not in buildings, but where neither moth nor rust do corrupt, nor or where thieves do not break through and steal. Send some of your household treasures that way and they will be polished and made brighter and better.

Dr. James Fletcher: I am very glad to be here at your thirtieth convention, and I congratulate you that your Association is stronger to-day than it ever was before. I congratulate you that, although Mr. Derbyshire is retiring, you are able to put another good man in his place; but I hope you will never get away from him and that he will never get away from you.

REPORT OF INSPECTOR J. H. ECHLIN.

I have much pleasure in presenting to you my report as Sanitary Inspector of Cheese Factories and Creameries for Eastern Ontario. I began work on the first of June and finished on November 30th.

The territory allotted to me was that portion of the Province lying between the County of Hastings and the boundary of Ontario and Quebec, in all 12 counties, and in this territory some 667 factories are located. Of this number I succeeded in visiting 560 before the close of the cheese season, that is, Oct. 31st, the month of November being occupied in making a second visit to some of the places, where work of a special nature was to be performed in order to comply with the recommendations made during my first visit, and in holding meetings with the people to discuss the conditions as they existed in their particular sections.

I found that much good could be accomplished in this line of the work, and invariably found the people very willing to improve their factories, or, in the case of private enterprise, to advance the price of manufacture to enable the proprietor to do this; and it is very gratifying to me to assure the Association that a very great deal of credit is due the farmers and dairymen of this country for the live interest they have taken in the work during the season.

I might say that much of the Cornwall section was visited a second time, and I was greatly pleased with the earnest way in which the people entered upon the work of improving their factories. The opening of 1907 will find a great change in the appearance of a large number of the factories in that section.

I also visited the Renfrew County and Vanleek Hill sections a second time for the same purpose for which I visited the Cornwall section, and found that many important and valuable alterations and improvements had already been begun.

Many encouraging reports have come to me during the past month from every section of my territory, and I beg to assure you that scores of factory buildings will be greatly improved between now and the opening of the season of 1907. Many of them give promise of being, if properly manned, in a thoroughly sanitary condition, and fit for making an article of human food in, which is much more than could have been said of them in the past.

I might say that I was expected to visit the patrons of factories as well as the factories themselves. For different reasons, however, I was unable to take up this feature of the work to any great extent. In the first place, the extent of territory I had to cover, and the number of factories I had to

visit, practically precluded my doing this; and, furthermore, in many instances it seemed useless to ask the patrons to improve the conditions at the farms until the factories were put in a more sanitary and cleanly condition.

During the early part of the season considerable improvement was made on some of the buildings, and in several instances a better water supply was provided, although in many places the shortage of water was a great hindrance to the makers in the way of keeping their factories clean.

One of the most frequent evidences of carelessness on the part of proprietors, patrons, and makers was the filthy condition of many of the whey tanks, and I feel that it is an insult to the women of this country to ask them to clean the milk cans after we have filled them with the whey from such tanks.

The nature of the improvements called for in the case of many factories was such that the work could not be done until the close of the season. For instance, the condition of many factories called for the laying of new floors: while that of others necessitated the lining and painting of practically the whole interior.

Thus far I have spoken in a somewhat general way, and I would now ask you to bear with me while I briefly present the following data, which will, I hope, prove both interesting and instructive:

As already stated, my work of inspection began on June 1st and terminated on Nov. 30th. During this time I inspected 560 factories. Of this number 18 might be considered first-class places, having all necessary appliances and well kept inside and outside; 116 good sound buildings were visited, 92 having really good sites. I found 203 factories having a good, pure and abundant water supply, and 63 having splendid drainage. I found the whey tanks at 52 factories clean and tidy and apparently well kept.

During the summer I visited 65 factories which were not receiving any instruction from any of Mr. Publow's staff of Instructors. Amongst all the factories visited by me during the season 35 buildings were considered to be entirely unfit places for the manufacture of cheese, and 78 new floors were asked for; while the interior of 209 make-rooms require overhauling by ceiling, lining, painting, etc. I have a personal knowledge of the water supply at 32 factories being improved during the season, and of several new buildings being erected to replace the ones destroyed by fire during the latter part of the season, so that we have every reason to look forward to the opening of 1907 with a great deal of pride and satisfaction.

J. H. Echlin.

The Chairman: I am sure we are all very much gratified with Mr. Echlin's report. He has always been a live energetic man possessed of more than an ordinary amount of common sense. We are very much gratified with his report, and the work he has done during the past season.

Moved by J. R. Dargavel, seconded by L. Patton that "Whereas the Dominion Government has announced a decision to discontinue the operation of the cool cheese curing-rooms established in 1902, on the ground that they have served the purpose for which they were intended, resolved that this Convention place on record its acknowledgment of the great value of the illustration which they have afforded, and the impetus which, through their operation, has been given to a most important movement for the betterment of the Canadian cheese industry, viz., the cool curing of cheese. Carried.

Moved by E. Kidd, seconded by Mr. Hume, that the heartiest thanks of this Association are due to Mr. E. G. Henderson, Manager of the Windsor

Salt Works, for the very handsome badges which he has again supplied officers and members of the Association, and for the very material assistance which he has rendered this Association from time to time. Carried.

Hearty thanks were also passed to the press, the railways, and the Council and business men of Ottawa for courtesies shown.

ELECTION OF OFFICERS.

The report of the Nominating Committee was received and adopted. The list of officers is given on page 5.

Mr. Derbyshire: I met the new directors in an informal way last night. I think it was about 2 o'clock when we got through discussing matters for this year's business, and I was very much struck with the intelligence of these young men who were elected to these various positions. I was very much pleased with their style, and they are going to be a great acquisition to us. I believe they are going to help us in the future, and co-operate and work with us as heartily as we have worked in the past. Last night I was presented with a gold-headed cane, and I was completely taken off my feet. I will preserve it as long as I live as a memento from this Association, and I will hand it down to my children, and I hope that they will hand it down to their children's children. I appreciate it more highly than anything I have ever had in my history, because it shows that the work I have done in connection with this Association has been appreciated by the men who have been most closely identified with it.

DAIRY INSTRUCTION AND SANITARY INSPECTION OF FACTORIES and CREAMERIES.

The following was read by the Director of Dairy Instruction, Mr. G. A. Putnam:

The dairy instruction of the past few years has resulted in a marked improvement in the general equipment and sanitary conditions of factories. Many proprietors and makers have, however, stated to the instructors and members of the Dairymen's Associations that they were somewhat discouraged after going to the expense and trouble which were found necessary to make the improvements considered essential by the dairy instructors. "We have gone to considerable expense in order that the quality of cheese may be of a higher standard, but our neighbor factories have gone on in the same old way manufacturing along cheap lines, and they, for the most part, secure as high a price for their cheese as the better equipped factories. In many cases the poorly run factories manufacture for a lower rate than a well equipped and improved factory thus making the burden still greater for those who are anxious to do what is essential if the industry is to be placed on a sure and permanent basis."

The sanitary inspectors for the past year, Messrs. J. H. Echlin and T. Dillon, have effected a marked improvement in the sanitary conditions of factories. They went out from the department clothed with authority to assist upon improvements which were necessary and which had, in many cases, been recommended by the instructors, but which had not been made.

Many expressions of appreciation of the work accomplished by these inspectors have been received from all sections, and the better class of dairymen throughout the Province are strongly of opinion that work of this nature should be followed still more closely during the coming season.

The representatives of the dairy associations, and the chief instructors as well as the regular staff of instructors are of one opinion as to the advisability of clothing the instructors with the power of sanitary inspectors, and so arranging the districts that every factory and creamery will be subject to regular and systematic sanitary inspection, and may have the benefit of instruction as well. In order that the opinions above expressed might be put into tangible form to be placed before the Minister of Agriculture, the Director of Dairy Instruction called a meeting of the chief instructors, sanitary inspectors, and representatives of the two dairy associations to meet in Toronto, on the 8th inst. Those present were Chief Instructors, G. H. Barr and G. G. Publow. Sanitary inspectors, T. Dillon and J. H. Echlin. Representatives of Eastern Dairymens' Association, R. G. Murphy, J. R. Dargavel, M.P., and J. H. Singleton. Western Association, Thos. Ballantyne, Jno. McLevin and J. N. Paget. After discussing the subjects before them at great length they unanimously decided upon the following system.

(1) That the whole Province be divided into such sub-divisions as would give each inspector from 35 to 36 factories or creameries. This will require a staff of 38 instructor-inpectors, and it is considered by those who have had the work in charge that the men appointed to the work would be able to render more effective service than in past years. Many of the better factories are really not in need of regular instruction, and in the majority of cases a call of an hour or two from the instructor will be just as effective as to spend a whole day with the maker in manufacturing a lot of cheese. This will give the instructor-inspectors an opportunity to visit many of the farms, and to advise with the producers as to the best method of producing the desired quality of milk. In the opinion of the chief instructors the chief essentials in producing a first-class article is that the raw material receive proper attention by the producer and milk hauler. Chief Instructors, Barr and Publow stated that "90 per cent of the rejections can be traced to inferior raw material."

(2) That every factory and creamery in the Province be charged a uniform fee of $12.00 to help defray the expenses to the Department of furnishing instructor-inspectors. The total appropriation necessary for the work suggested by the joint committee is $42,700, and upon the basis of the $12 tax above mentioned, the factories and creameries will contribute $16,000 towards this expenditure. It was at first thought that a sliding scale would be more equitable, but after discussing the question from all sides it was decided to recommend a uniform fee, chiefly for the reason that the smaller factories and creameries are usually in need of a greater amount of instruction than the larger factories and really demand as much or more time than the larger concerns.

(3) That the instructor-inspectors be required to test milk and cream for adulteration or tampering, but only in those cases in which application is made, and the maker or some other responsible person furnishes the department, or one of the chief instructors with evidence that adulteration or tampering has been practised. In some sections the time of the instructor has been almost entirely taken up with the work of testing, and it is considered by the representatives of the Associations and the Department, that the persons identified with the factory should be qualified to make prelimin-

ary tests and investigations sufficient to furnish evidence that tampering or adulteration has taken place before the services of the inspector be asked for.

(4) It is also recommended that any owner or manager of, or assistant in a cheese or butter manufactory who shall knowingly receive or make into cheese or butter any milk or cream that is tainted, gassy, over-ripe, or delivered in rusty or unclean cans or utensils, or in which a preservative of any description has been used, or which has been drawn from cows suffering from lump-jaw or other infectious disease, shall be liable to a fine. We now have a provision under which the producer can be prosecuted, provided he sell or suply to a cheese or butter manufactory any milk that is tainted or badly soured, and it is thought to be distinctly in the interests of the industry to have a provision by which a maker or proprietor can be dealt with, provided he accepts any such milk to be manufactured into a food product for general use. This will have the effect of practically prohibiting a maker from accepting milk of inferior quality which has been refused at a neighboring factory.

It must be remembered that the above are recommendations made by the joint committee to the Department, and the same are being published at this time in order that the comments of the dairymen generally may be secured before definite action is brought. The Department is desirous of doing only that which shall be in the best interests of the cheese and butter industry of the Province and wishes to adopt such measures as are necessary to secure the same, but at the same time, wishes to avoid doing an injustice to any person or persons. It must not be inferred that instruction is to be abandoned and an army of men sent out merely to give orders to the men who own the factories and herds of the country. It is the desire to so rearrange the work of instruction and sanitary inspection that it can be done most effectively at a reasonable cost, and in the best interests of the owners of factories, the producers of milk, and the makers.

The Director of Dairy Instruction, Mr. G. A. Putnam, would be glad to receive suggestions or recommendations from dairymen regarding the proposed regulations.

Mr. PUTNAM: Your joint committee have made these recommendations. I am not speaking as a representative of the Department, but as one of the committee representing the Association, and what I say is not under the authority of the Department. I cannot promise you that the Department will pass these laws, or adopt these measures, but I hope this Association will bring these matters before the Department in as strong a form as possible, and impress upon them the necessity for the regulation. There is no person who does not appreciate the necessity for some steps which will insure a uniform method throughout the whole country and uniform high quality of product. Whatever method is adopted we must make some change in order to accomplish the end in view.

It is true that we are gaining ground from year to year, but the gain we are making is not what the chief instructor considers satisfactory at all. You, as an Association, have to remember that this method increases considerably the net cost to the Department, and you have to approach the Department and secure an increase of funds. If I had the dealing out of the money I would give you all they got from Cobalt. This is the place where we come to formulate our ideals for the year, and after we have formulated our ideals, then our ideals will make us during the year. If we hold up to a high ideal at the beginning of this dairy year, and work towards that, we can rest assured the year will be a profitable one. I would like to see this

matter discussed. There are two sides to the question. I recognize that the great majority are in favor of these recommendations as they stand. However, I know representations will be made to the Department by interested persons against the recommendations. Take the individual factory man, and he can make out a pretty strong case against these regulations, and I trust your Association will put the case as strongly as possible before the department.

Mr. Derbyshire: This means that we are going to reduce the price of inspection from $15 to $12, and we will make everybody come in and pay $12. (Applause.) We are anxious to have some control of every factory that is making cheese in this country, because our product is coming before the world, and we want it to be the finest in the universe. I think the instructor ought to have $1,000. We want the best men in Canada, and we want to pay them enough so that they will feel that they are getting paid. It will never do for us to pay them a salary so small that they will want to leave us and go into something else. That will never do. We want to give them a price that will keep them in for the profession, and keep them in touch with us. A man will never do the best work if he feels that he is not properly paid.

Major Redmond: I think you had better let this question be laid over to be discussed by the people. It is not unanimous in this country. I was sent here to oppose that resolution by two or three cheese-makers who are not willing to pay the price to be inspected. They can do good work themselves.

Mr. Derbyshire: You know, Major, no man can live unto himself.

Major Redmond: What are you going to do with a factoryman who says he does not want an Inspector, and that if he comes to his factory he will kick him out?

Mr. Derbyshire: We will turn him out of the synagogue.

Major Redmond: If you have from 30 to 40 patrons who say, "Go on; we will back you up," what then? I think you had better leave this to the people. I do not like so much Government interference with the intelligent people we have in the dairy business. I think there are a great many who know how to run their own business, and in the section of the country where I live it is not a popular movement. I cannot say the people will be in favor of it. If we are forced into it we will make trouble.

Mr. Derbyshire: Provided we adopt this resolution you will have the pleasure of writing to the Government and everybody else in Eastern and Western Ontario can write to the Government, and send deputations and give them your idea. All we are doing is recommending this to the Government.

A Member: We must have compulsory legislation to make them clean up and do what is right. We have too many factories and too many cheese-makers who are inferior, too many inferior men. The Government should go ahead and make this compulsory. (Applause.)

Mr. Alexander Hume: I think this has been pretty well thrashed out through the whole Province, and to my mind the vast majority of people are in favor of it, because so many factories have again entered the syndicate, and I will therefore take much pleasure in moving the adoption of the recommendations.

Mr. Kidd: I have much pleasure in seconding this motion. I have recommended the syndicate system for 25 years. When we only had one instructor I was in favor of supporting him and would pay him with my own

private funds. I think we are only getting things in shape and running order. I think every factory should support it. (Applause.)

Mr. Wright, M.P.: I have no doubt from looking over the audience here that most of you are cheese-factory men, and perhaps you will like to hear some views from the creamery side of the question. I do not think we can find a single man throughout the length and breadth of this Province that would not say we should do everything in our power by legislation and by persuasion and by every possible way to promote the interests of dairying, and if it is absolutely necessary that some of the black sheep should be washed we will wash them. (Great applause.) If some of the men in this audience have had to go the way I have had to go to farms where they had cream separators, and see the places where the cream is separated, and if they saw the kind of cream delivered at the factory at some seasons of the year, you would begin to think that moral suasion was not enough, and that something else would have to be done. If we cannot get these people to do it willingly they must be made to do it. (Applause.) We cannot afford to let the quality of butter and cheese go down, but we must bring it up and up all the time. There is no limit to the demand for the best stuff. I could sell a carload of creamery butter a day at 27c. a pound if we could only have the right kind of stuff. I am delighted to know that the intelligent people of this meeting see the necessity for doing something and will carry this resolution. So far as I know, in my constituency, in South Renfrew, there is not a cheese-factory but will hail this thing with delight. If there is a small number who will not do the right thing they should be made to do it. (Applause.)

Mr. Derbyshire: I don't want you to make any mistake by thinking that Major Redmond is a black sheep. He is only voicing the sentiment of his friends in that locality.

A Member: There is no doubt that there are two sides to the question. Coercion is not a very nice thing to talk about. That paper Mr. Putman read is only a proposal. Think of the great amount of money that is being spent all over the country for the instruction of cheese-makers. Take any other industry and you will not find that there is the same amount of money spent by the Government for instruction purposes. I am in the cheese business, and if I am competent to run my business, why should I go and ask another man to help me? I have been running factories since 1875. There is no doubt that if a man does not want to employ an instructor it should be arranged so that he would not have to pay $12. When you come to look at it from a business standpoint it seems to me that it is a little arbitrary to compel people to do certain things they do not want to do.

The motion was put to the meeting and carried.

COOL CURING OF CHEESE.

By J. A. Ruddick, Dairy Commissioner for the Dominion, Ottawa.

I intend to say a word or two on the cool curing of cheese, because so many men have asked me for information on this particular subject. I suppose that is because I have been actively engaged in promoting the work of the cool curing of cheese. During the last five years I have had excellent opportunities for getting information on the subject. It will not be necessary for me to take up your time discussing how to build a cool cheese curing

room or how to manage such a place or what the result may be, because I may tell those of you who haven't received a copy of my last annual report, you can get one, and it contains full information on that point. Plans and specifications for building ice chambers and some information concerning different kinds of installation, and the tests we conducted last year, are really the only reliable data I know of on that point. There are three points connected with the management of these curing rooms.

I want to mention one particular point in connection with this matter. I have experienced rather more difficulty than I expected in making an impression on the Old Country market with cool cured cheese, and I want to show you how that has come about. You know that cheese have been delivered to these cool curing rooms in quite large numbers, I think 142,000 delivered in five years, but they have come from 104 different factories, so that there are a great many different lots of cheese. They have been bought in the ordinary way, one buyer buying one factory, and another buyer buying at two factories more, and so on, so that they have been taken by the buyers in apparently small lots. The buyers have found this difficulty, that they have not had a sufficient quantity of these strictly cool cured cheese to fill any order, so that they have had to fill in with other cheese to make up an order. That has been the difficulty, and it has been rather hard to overcome. Some of the buyers have brought in larger quantities, and have had more success by being able to fill whole orders with cool cured cheese, and when they were able to do that the result was very marked indeed. Many of these cheese have been bought in summer months and shipped in the season when they have been compared with fall made cheese, and in that way they have not always attracted the attention that they might; but we have found that the trade is wakening up. They are slow to wake up. They do not pay much attention to small quantities of cheese. It takes some time to make an impression on them, but last year I found that the trade in Great Britain was wakening up to the importance of cool cured cheese.

Another thing which was rather unfortunate was that there was a constant confusion or mixing up of the cool cured cheese with paraffined cheese. Very often the paraffined cheese was attracting their attention, and it was largely a question of paraffining in the minds of a great many, and there is no necessary connection betwen the two things. It was somewhat unfortunate that they became so associated. I want to read one letter I received unsolicited the other day, and it covers the point fairly well regarding the impression on the part of the British merchant as to the quality of cool cured cheese.

13 Greenwood St., Manchester, December 18. 1906.

Mr. J. W. Ruddick, Department of Agriculture.

Dear Sir,—On going through a line of white and colored cheese to-day, September made, all Western goods, we wanted a few hundred boxes for a very particular buyer. We got him fixed up, but he was not altogether satisfied with the quality, and kept repeating that they were not up to our usual standard. On going to the colored lots, we picked 400 or 500 boxes without turning down a factory, and our buyer expressed the pleasure that it was to have cheese of this kind offered; every lot was as near perfection as you can get cheese.

On going into the matter to try and find the difference, we at once saw that the colored had been cured in a Government cool curing room at Brockville, while the white had been cured in the ordinary way.

If any of your farmers had been in our warehouse to-day they would have had an object lesson in the value and importance of having their cheese all done in the same way. In our minds it makes a very much bigger difference than people imagine, and if this way was adoptd generally Canadian cheese would hold a very much higher place in the opinion of the trade than it does to-day

Yours faithfully,

Wall & Co.

This is the opinion of one of the leading firms of Manchester. I think there can be no doubt in the mind of any person who has followed this matter at all, that it is very desirable thing that all our cheeses should be cured at a uniformly cool temperature. I am not going to waste time arguing that point. In Eastern Ontario there are some difficulties which no one realizes more than I do. I have realized it from the start. In this eastern part of Ontario, practically all the factories are owned by private individuals, and the result is that we have a ruinous competition. They hesitate to provide cool-curing rooms unless they are sure of being recompensed for it in some way. I have always appreciated that difficulty, but I have always taken the ground that if the patrons of these factories wished to secure the benefit of cool curing of cheese—and there can be no doubt of the benefit—then it is their duty to bear part of the expense, and I am glad to say that the patrons of some factories have agreed to do that. In Peterboro and Belleville and Prince Edward County Districts, there has been a very strong movement towards establishing cool curing rooms, and from information I received the other day I think that next season, in the neighborhood of Peterboro, Belleville, and Picton, there will be forty-one cheese factories fitted up with especially constructed cool curing-rooms. These factories are in a better condition to do things of that kind, because the patrons are the stockholders and they derive the whole benefit. I am sorry there are not more of the patrons of factories here to hear this point discussed; because I believe it is of great importance. Naturally the patrons of these proprietary factories take more interest in this question. It is not likely we will have as much improvement as we should have. Districts like Belleville, Peterboro, and Prince Edward, where they are going into this in general will soon make reputations for themselves. They will outdistance anything in this country. They have made wonderful progress already, and any exporter of cheese in Montreal will tell you that. I have often discussed this question.

I want to say a word or two as to the improving of our home trade, and the bearing that cool curing of cheese has on that trade. I mentioned yesterday that early in June last summer I had a number of small Stilton cheese made something like one hundred. They were made at two different factories, and these cheese were taken the day after they were made and placed in a cool curing-room and left there all summer. I believe that with cheese like these we could increase the consumption of cheese in Canada five or six times. We are overlooking a very important market in this Dominion of Canada. If there were six million of people on the other side of the earth that were cheese eaters we would be tumbling over some one else to get over to that market. Here at your doors we have overlooked it. We have no very definite statistics as to what the consumption of cheese in Canada is. Taking the figures of the census returns, we could make a calculation which is more or less an estimate; but according to that the annual consumption is about six pounds per head in Canada. The Western population, which is increasing so fast, is beginning to demand more cheese, and they consume a very large quantity of it. This food is particularly adapted to the prairie country where it is so difficult to get meat in the summer months. The trouble is that the great bulk of the cheese which is offered to the Canadian consumer is nothing but the culls of the country, and that is a great mistake. The people of this country do not want to eat culls; they want good cheese. People often ask me, "Where can I get a nice cheese?" and they say they would pay twenty-five cents a pound to be sure of getting a good cheese, and after I sold them one of these cheese they came to me and said, "Where did you get that cheese; that is just the kind we like and we should like to get some

more." There is nothing special about this cheese at all. It is just ordinary cheese; cheese kept at a temperature that never went over sixty. It became mellow and cheesy in flavor. It is not insipid or neutral in flavor; it is cheesy. If I were looking for some business, I know nothing I would go into more quickly, and I feel satisfied that I would make money just by selling cheese like that.

I had some correspondence with the editor of the *Canadian Grocer* on this subject, and he wrote an article pointing out to the grocers how they could increase the consumption of cheese by dealing in the right kind. The editor afterwards said that he met a number of wholesale grocers, and they were discussing the matter, and said cheese was cheese, and it was simply a matter of a fraction of a cent on the price that decided them as to whether they should buy the cheese. Someone has spoken of the difference that was made in the trade at Gananoque by supplying their customers with well cured cheese. It was a great increase in consumption of cheese. Wherever you find a grocer that is giving this thing some attention, and who lays in a stock of cheese and keeps it in condition, he always gets a big trade. There is a firm in this city that make a special feature of that. They buy a large quantity of cheese in the right season of the year, getting only well-cured cheese, and always have that kind of cheese to offer customers, and they do a very large trade. You will know that if you get the kind of cheese you like you eat much more than you would eat if you got a sour, dry, bad-flavored cheese.

I go about the country a great deal, and I tell you it is very seldom I pick up a piece of cheese I want to eat. That should not be the case in a country that boasts the making of such fine cheese as we do. We must give this matter careful attention, and not supply Canadian people with culls. Those were June cheese that were kept all summer at a temperature that did not go above sixty degrees, and that shows the effect it would have on our cheese trade in this country if our cheese were handled in that way, as there will be no doubt they will be in the near future.

Mr. Derbyshire: Eight or nine years ago we used to put in fifty cheese at Brockville, then we got up to one hundred, then two hundred, and now a thousand, and they are all sold out before I want to sell them. We bought in a good many more this year, and they are going just like hot cakes. They are taking these cheese to be shipped to every part of the country, and I wish I had a thousand more than I have. They are consuming four times as much cheese in Brockville as they did before. They never ask about the price, but say, "Can you let me have a nice cheese?" and then I fix the price. (Laughter and applause.)

CO-OPERATION BETWEEN THE FACTORY AND THE FARM.

By J. H. Grisdale, Agriculturist, C. E. F., Ottawa.

I want to discuss the part that the cheese-maker or that the factory man can play in helping the average farmer to improve and to increase the output of his farm. In my observation I find that there is a very great lack of co-operation between the maker and the farmer. The farmer does not take very much interest in the maker except to see that he does not give him a few pounds short on his milk in the morning. He never knew him to give him a few pounds long that I know of. The maker usually thinks of the

farmer as a man who brings him so much milk, and who ought to bring him a little more and a little better quality if he possibly can, and he has very seldom much to do with him. Now, I think we have been long enough in this dairy industry, and there ought to be a great deal more co-operation between the makers and the farmers. If the maker is a maker deserving of the name he should be a man among men.

A MEMBER: He doesn't get enough pay.

Mr. GRISDALE: We will have to remedy that. We are trying to do it all the time, and he is gradually coming up all the time. I believe that the educational work that is being done all through the Province by this Association will have its result, and we will see a greater measure of co-operation between the makers and the farmers in the near future than there has been in the past; and the greater that co-operation is developed the better it will be. The maker has a great opportunity in the factory district because he comes in personal contact with practically every man. If he does not meet him he sends in his report, and has an opportunity for making suggestions which will be invaluable. I want to suggest to the makers this morning some of the lines along which they can help the farmers by their suggestions.

In the first place let me suggest that you take a little more interest in the returns of every man who is shipping to you; show some interest. You have no idea what a wonderful help that is to the farmer. I speak from experience as a producer, and in observing the work done by a good number of makers. The good work that the good maker can do by speaking encouragingly to the farmer is wonderful. You do not need to do that to a man who is shipping you 5,000 to 6,000 pounds of milk a day, but even a word to him will have a good effect. It is the little chap we want to encourage: these fellows who have only 200 or 300 pounds a day, and who ought to send 400 or 500 just as easily. I know what can be done in that line. Let me give you an example of a maker in Nova Scotia whose career I have watched with very great interest. He started seven or eight years ago in a factory where he had 25 to 30 patrons, and they were sending him an average of 75 pounds of milk a day. They were as little interested in the dairy industry as you can imagine any one to be. At that time the prices were comparatively low, but he set right to work and got to know his patrons. He encouraged them, spoke to them about their work, and in that way he got the farmers thinking that he was interested in them, and that the maker was really trying to make a success of the cheese business. The result is, that he has now as many more patrons, and the patrons instead of sending him 75 or 100 pounds of milk are sending from 200 to 400 pounds. There is an example of what one man did, and there is nothing to prevent every maker in this eastern country doing similar work. All you have to do is to encourage them a little bit, and you will be astonished at the results.

Another way in which you can do good work is by taking an interest in these cow records that the Hon. Mr. Fisher, Mr. Whitley, and Mr. Ruddick spoke about. I was very much interested in my office this morning in going over the report from one of your directors, and I am sure that Mr. Carlaw will pardon me if I speak of his report. I find that he sent milk from twelve to thirteen cows to the factory, something like 137,000 pounds of milk last year; that is a record worth mentioning and a record to be proud of. Some of his cows have given almost 7,200 pounds of milk in nine months, and when we get cows that will do that why should we be satisfied with cows giving only 3,000 pounds? The cheese-maker and the butter-maker who is satisfied to let the farmer in his district keep on feeding that latter kind of cow, and say nothing to him about it, is not doing his duty:

and I think it is up to every one of you gentlemen to draw the attention of the farmer more and more strongly to the matter and try and get them to keep the right sort of cows. If you have not a cow-testing association formed in your district, and you can get any one interested in the thing at all, let us hear from you, and we will be delighted to do everything we can to help the farmer to keep records. You can get the scales from Derbyshire & Co., and from other firms in Canada. The cheese-maker might keep a few scales to sell, and he might keep these blanks. I would be only too pleased to send blank forms to every cheese-maker who would write me, and do everything to persuade him to circulate them among the farmers, and get them to keep a record. I do not think there is a district in the Eastern townships where we have not more or less of the farmers keeping these records. The cheese-maker and the butter-maker is a man who can organize these cow-testing associations by persuading the farmer to do it, and let me urge upon you not for the sake of the country, not for the sake of the association, but for your own sake to do this. Why are you getting small salaries to-day? Why do you not get more money and live better than you do? Because the factories are so small; because there is an insufficiency of milk; because you are not getting the milk you ought to; and because you do not take the interest in the production of milk that you should.

It is not enough to try and persuade the farmers that they should keep better cows and weed out the poor ones, but let me urge upon you and advise you to feed them. I want you to do something encouraging the farmers to be prepared for dry weather; we often have dry weather in the summer when the pastures dry out, and there is not one farmer in fifty who has made any provision to overcome that difficulty.

Q.—If you have not green feed would you recommend feeding bran in the summer time?

A.—Yes, but it is not as good as the green feed, and it is dearer. If you have sufficiency of grass probably a little meal would not do any harm; in fact, I have known it to do good.

HINTS ON CHEESE-MAKING.

By G. G. Publow, Chief Dairy Instructor, Kingston.

I never was better pleased with the Dairy Convention than I was yesterday. I was particularly glad to see so many cheese-makers and factorymen present. I do not think we ever had a convention where we had so many cheese-makers and factory owners present. I am sure there will be splendid results from this meeting here in Ottawa this year.

There is one thing I am particularly anxious about, and that is this moisture in the cheese. I said many years ago the man who could invent some rapid means whereby we could determine the moisture in cheese would make a fortune. What we are doing at Guelph, or whatever it may be, in inventing something that will do so is a splendid work.

There is only one way in which you can get the best results. It is better to aim to get the milk in proper condition than to try to remedy defects in the milk, but when we have got the defect in the milk we should know what to do to get the best results. I have said before that the men who produce the milk are the greatest factors in the quality, and there is no person who should be in a better position to tell the people just what they should do than the men who are handling the milk, for they know, and I was very glad to hear Mr. Grisdale speak to you the way he did.

I am speaking to you now regarding the quality of your milk. If you find the milk is not working to your satisfaction you know what is the matter. You know that if it is over-ripe, and you were to leave a certain amount of moisture in that over-ripe milk, what would be the result in that cheese. I want you to answer that question from the floor of this house. What would be the effect on the quality of the cheese if you leave the same amount of moisture in the curd from that over-ripe milk?

A Member: It would be acidy.

Mr. Publow: Be careful regarding the moisture. If you have any fault in this Eastern section in the making of cheese it is that you are not careful enough on that line, and if your cheese are faulted in Montreal it is due to the fact that they are not sufficiently firm when the acid comes on. That applies to this Eastern section, where it is due to your receiving over-ripe milk. In 95 per cent. of the cases of rejection from this section the cheese are of that character. We all know they are soft enough. But these cheese dry out after a while, and then they are acidy. What we want is to make soft, mellow, meaty cheese. You must have sweeter milk to make that kind of cheese. If you leave the moisture there you must draw less acid. We have no trouble with our cheese except in hot weather. Do you believe you are any more careless or indifferent in handling the milk in that weather?

To my mind there is nothing that could be done that will do more to improve the quality of our cheese—that is removing the acidity—than to get the milk to the factory at a lower temperature. Now you must have something cold to do it with, and the average farmer will not take time with water, so I would recommend the majority of people to put in ice. (Applause.) They will be making money for themselves and making conditions such as will give you a greater love for your work and you will be able to make better cheese.

Mr. McPherson: Would you not go further and advocate that every dairyman should put in ice?

Mr. Publow: I would like to go on record as saying that he is not properly equipped for carrying on his business, unless he has got some provision whereby he can control the temperature whenever he sees fit. I do not know whether Prof. Dean was picking at me last night. I have always said that the best way to prepare milk for the cheese-maker or for table use is to run it over a cool surface immediately after it comes from the cow. Unfortunately the appliances required for that are a little expensive, and the farmers feel they cannot buy them. I believe they cannot afford not to buy them. The next best thing is to put the vessel holding the milk into cold water or ice. Perhaps the simplest way is to put the cold cooling material into the milk, but it is a mussy way. You all know that farmers are scarce of help and they want to do things in a hurry. The mussiness can be overcome by having a pan. If every person cannot have the best let us have the next best. Get the milk cooled in some way.

I want to impress upon you that you should be the educators of the people. You know exactly what you have to make and that is fine cheese. I want you to be readers. I want you to inquire into milk conditions. Find out, as far as you can, what the trade demand and what they will pay the most money for. I would make green cheese if they would pay enough money for them. Our business is to make the kind of cheese that will bring the highest price, and I want the people themselves to enquire, and not be satisfied with 13c. I think that is a good price, but I do not think it is anything near its value. Last year I said early in the season that I believed cheese would sell for 13c before Christmas, and I was laughed at by the

Montreal men, but it reached 13c., and I hope it will never be below. The farmers' business is not to be satisfied with 13c., but to inquire "Can we make this cheese so that it will bring 14c.?"

Let us advocate the value of the goods that we are putting on the market and not find fault with them. Let us blow our own horn, if you like. Cheese is worth more than meat. The proof of the pudding is in the eating, and it is the condition in which these cheese go to the consumer that makes the mark. What the farmers of this country want is a strong demand for cheese at high prices. To maintain that high price is to have a high quality. That applies to home consumption as well as foreign trade. We could increase our home consumption 500 per cent.

We want to make the conditions surrounding the manufacture of cheese attractive so that the people in this country and other places will talk about the clean tidy places where the cheese is made and where the milk is produced, and about the clean tidy barn and the men who are producing the milk. I want every cheese-maker in this country to be clean, tidy, right appearing fellows, and I want them to keep their factory in a proper condition, making them attractive, getting the people to see the conditions in Canada are excellent and that you cannot find a dirty factory. We do not want them at all. You know what these miners did when the report of the investigation into the canned meat trade was given to them. They took off their hats and said "Hurrah! for clean Canadian cheese." (Applause.) Did we honestly deserve it?" (Cries of "Yes, yes.") I hope next year we will deserve it. I hope every cheese-maker will go home from this meeting determined to do better than he ever did before. (Applause.) Don't come here and merely listen to what has been said. Pick out the things you see you will be benefited by.

Those of you who have been making good cheese should be slow to make a change. The farther we go away from certain principles the farther we have got to come back. We have got to hover around one thing. The kind of cheese the people want are clean flavored, mild cheese—close boring, if you like. They should be smooth and silky in texture, and the appearance of the cheese should be bright and attractive, so that the very first thing a person will see when they see it will be "I want a piece of it." Do you think a box that is rat eaten and mouldy, or cheese with a soft rind, is attractive? Just imagine cheese of that kind being put along side of bright looking cheese. Which is likely to tempt your appetite? If you make a bad lot of cheese pay for it like a man. If it is not fit for sale burn it, or give it to somebody to feed their pigs.

The people of this country do not mind paying a little tax for getting improvements; because the higher the price of cheese, the more prosperous the people of a country will be. There is not a citizen of this country who was not benefited by the high price of cheese this year.

We all want to unite in this work and make this industry attractive to ourselves and every person else. If you all do your best we will have the best year in 1907 we have ever had in this country.

The Chairman: I would like to draw your attention to *The Canadian Dairyman*. This is our paper, and these thrifty instructors ought to take that paper so that we will have fresh business in connection with our industry placed before us each week.

We have had the best addresses at this meeting that we ever had. (Applause.) Will you help us in this year, 1907? If every farmer who produces milk would give the least bit of attention to the regularity of milking, seeing that the cows had good water, and if you would have extra silos

to open up when the hot weather comes, so that cows could be fed in plenty, it would be a good thing. I hope every factory-man will do the best he possibly can and try to produce more milk and a better quality and keep the factories in a better condition. I do hope that 1907 will be a great year in the history of Canadian dairymen of Eastern Ontario.

REPORT OF COMMITTEE ON PROPOSED DAIRY EXHIBITION.

To the Directors of the Eastern Ontario Dairymen's Association:

GENTLEMEN,—Your committee appointed last September at the time of the Toronto Industrial Exhibition, to consider the desirability and advisability of holding a national Dairy Show during the winter of 1908, begs leave to submit its report. Your representatives met at the Exhibition grounds, a committee from The Western Ontario Dairymen's Association appointed for the same purpose, and composed of Messrs. T. Ballantyne, Jr. President of the Western Ontario Dairymen's Association, Mr. J. N. Paget, of Canboro, Mr. John MacLaren, of Mapleton, and Mr. G. A. Putnam of Toronto. Mr. J. N. Paget was elected chairman of the joint committee, and Mr. H. B. Cowan, secretary. The representatives of the Western Ontario Dairymen's Association reported that the proposal to hold a National Dairy Show had been discussed by the directors of their Association, and all had pronounced themselves in favor of the holding of such a show. It was decided to canvass the exhibitors of dairy machinery and of dairy live stock at the Toronto Industrial Exhibition to ascertain their views in regard to the holding of the proposed show. It was further decided to approach the city councils of Toronto, Guelph, and Peterboro, to ascertain what assistance in the way of accommodation they would be willing to furnish, should it be decided to hold the exhibition in their city.

A canvass of the representatives of the dairy supply firms at the exhibition revealed the fact that they were enthusiatically in favor of the holding of the proposed show. All promised to make exhibits of dairy supplies and dairy machinery at the show, should it be held. Several promised to make large exhibits.

Some of the leading firms claimed that they would like to make exhibits at the conventions of the Dairymen's Associations as now conducted, but that the expense of making exhibits was too great, the number of people they would reach is too small, and the conventions do not last long enough. They pointed out that at such a show as is proposed, they would be able to reach the dairymen of both Eastern and Western Ontario, as well as from the other Provinces and the United States, as if properly conducted and advertised, a large attendance from distant points might be expected. They appeared unanimous in the belief that such a show was needed, and that it would afford manufacturers of dairy machinery and dairy utensils an excellent opportunity to make exhibits of their goods known to the people interested in dairying. Such of the firms as expressed an opinion in regard to the point where the exhibition should be held favored Toronto as first choice, and Peterboro next. The firms interviewed included D. Derbyshire & Co., of Brockville; The Sharples Separator Co.; DeLaval Separator Company; National Cream Separator Company; R. A. Lister Company; The U. S. Separator Company; National Cream Separator Company; Oxford Separator Company, and the J. B. Ford Company, of Wyandotte, Mich.

Live Stock Breeders.

The exhibitors of pure bred dairy cattle at the Toronto Exhibition, also were unanimously in favor of the proposed show. Most of them promised to make exhibits of cattle. One Holstein breeder has offered to fill with his own stock whatever accommodations for cattle are provided. Several expressed the view that the dairy cattle interests at the Ontario Winter Fair are completely overshadowed by the beef interests, and that it is time that the dairymen broke away and held a show of their own. Among the breeders interviewed were Messrs. James Rettie, of Norwich; C. J. Gilroy & Son, of Glen Buell; A. C. Hallman, of Breslau; G. W. Clemons, of St. George; Alex. Hume & Co., and Wm. Stewart & Sons, of Menie; R. R. Ness, of Howick, Que., B. H. Bull & Son, Brampton; David Duncan, of Don; Robt. Tufts & Son, of Tweed, and T. Porter, of Carleton West. It was the opinion of most of the breeders that the Canadian Ayrshire, Holstein and Jersey Breeders' Associations would be willing to arrange to hold their annual meetings at the time of the National Dairy Show, should it be held.

Accommodation.

A strong deputation, composed of members of the joint committee, and a number of leading breeders of dairy cattle waited on Mayor Coatsworth of Toronto, explained the idea of the proposed show, and asked what accommodation might be expected from the city, should it be decided to hold the show there. Mayor Coatsworth evinced considerable interest in the project, but has since written the secretary of the joint committee that the members of the Board of Control, to whom the matter was referred, gave it but "little or no encouragement," and that the members of the Exhibition Association "treated it in very much the same manner." The editors of several of Toronto's leading papers, who have been made acquainted with the facts, have not considered the situation worthy of editorial notice. Mayor Coatsworth has intimated that the members of the new Board of Control may be more inclined to take action.

The City Council of both Guelph and Peterboro have expressed a willingness to do everything possible to make such a show as success. Guelph offers the use of the Winter Fair Buildings free of cost, points out the advantage of having the Ontario Agricultural College at that point, and promises a hearty welcome and co-operation on the part of the city.

At Peterboro, the members of the finance committee of the 1906 council, to whom the matter was referred by the city council, have intimated that the city will be willing to erect buildings, the equal of the Winter Fair Buildings at Guelph, provided that the show is held there annually. The committee has passed a resolution favoring the holding of the show at that point, drawing attention to the fact that Peterboro is in the center of one of the best dairy sections in Canada, and pledging the support and co-operation of all sections of the community in making the proposed show a success.

Other National Shows.

Your committee finds that National Dairy Shows, similar to the one proposed for Canada, are held annually in New Zealand, at Palmerston, in Great Britain at London, England, and in the United States at Chicago. Numerous meetings and conventions are held in connection with these exhibitions, and they appear to be accomplishing much good for the dairy industry in the countries where they are held.

We find further that the management of the Ontario Winter Fair, which represents largely the beef interests of the Province, has received grants amounting to many thousands of dollar from the Ontario Government, and that it is in receipt of a regular annual grant. The grant to the Fair in 1906 was $7,000.

The Ontario Horticultural Exhibition, which represents the horticultural interests of the Province, receives an annual government grant of $1,200 and is accomplishing a vast amount of good.

Summary.

In conclusion your committee begs to report, that it is our belief, that,

Whereas, there is a strong feeling among all classes of dairymen that the time is ripe for the holding of a large annual dairy show, that,

Whereas, extensive exhibits of dairy machinery and of dairy cattle have been promised already for such an exhibition, that,

Whereas, other countries interested in dairying hold large annual dairy shows, that tend to bring those interested in dairying into close touch with each other, that,

Whereas, the beef and horticultural interests of Ontario are being assisted financially by the Ontario Government in the holding of large annual exhibitions that are proving very successful, and,

Whereas, accommodation for a Dairy Show has been promised free of cost, by two cities; that,

The time has come when the Eastern and Western Ontario Dairymen's Asssociations should unite in the holding of such an exhibition, that an effort to that end should be made immediately, and that, if at all possible, the first exhibition should be held during the winter of 1908.

All of which is respectfully submitted.

Hy. Glendinning.
Alex. Hume.
H. Bronson Cowan.

Ottawa, January 9, 1907.

Moved by Mr. Kidd, seconded by Mr. Eager, that report be adopted. Carried.

CONSTITUTION AND BY-LAWS.

Preamble.

1. This Organization shall be known as the Dairymen's Association of Eastern Ontario, and shall have for its object the furthering of the interests of the Dairy Industry in all its branches, in that part of the Province.

(*a*) By holding an Annual Convention for the consideration of questions relating thereto.

(*b*) By co-operating in every way possible with the dairymen in the various dairy sections, and by holding local dairy meetings therein.

(*c*) By collecting, arranging and disseminating useful information.

(*d*) By co-operating in promoting the educational work of the Ontario Department of Agriculture.

(*e*) And by such other means as may be approved by the Minister of Agriculture.

Constitution and By-laws.

1. The Membership thereof shall consist of annual subscribers, of one dollar each, or such other sums as shall be determined by the Board of Directors, but other persons

who have been appointed by the Board of Directors from year to year, may be placed on the list of Honorary Members without the payment of such annual fee.

2. The Annual Meeting of the Association shall be held at such time and place as may be determined by the Board of Directors, and at such Annual Meeting a Board, consisting of eighteen Directors, shall be elected by the members thereof to transact the business of such Association during the next ensuing year, or until their successors in office are appointed.

3. The Association year shall be the calendar year.

4. The Directors shall elect from among themselves an Executive Committee of seven, which shall have the right to conduct such business of the Association as the Directors may specify.

Officers.

5. The Officers shall consist of President, First Vice-President, Second Vice-President, Secretary and Treasurer and a Board of Audit composed of two members.

Duties of Officers.

6. The President shall preside at all meetings of the Association, decide all questions of Order, make such suggestions as he may deem necessary in the interests of the Association, and shall be *ex-officio* member of all Committees.

7. The Vice-President, or in his absence, the Second Vice-President, shall perform all the duties of the President in his absence.

8. The Secretary shall keep all the records of the Board of Directors, furnish certificates of membership, notify all the Directors of every regular or special meeting of the Board, keep accurate minutes of the transactions of such meetings, conduct all correspondence of the Board as a body, present at each Annual Meeting a full report of the previous year's proceedings of the Association, as well as a list of the membership and the officers elected, together with such general information on matters of special interest to dairymen as the Association may have obtained, and perform such other acts appertaining to his office as Secretary as may be required by the Board.

9. The Treasurer shall receive and account for all moneys belonging to the Association, pay all bills and accounts that have been approved of by the Association's Executive Committee, and shall, before entering upon the duties of his office, enter into bonds with security, which shall be approved of by the Board of Directors.

10. The Board of Audit shall consist of two members, one of which shall be elected by the vote of the membership at the Annual Meeting and the other shall be appointed by the Board of Directors.

Their duties shall consist of auditing the accounts of the Treasurer and presenting a report to the Association and a duplicate of the same to the Minister of Agriculture.

11. The local dairy meetings shall be held at such times and places as a Committee, composed of the President, Secretary, Chief Instructor and the Director of Dairying, shall determine.

The Director or Directors living nearest to the place where such meetings are to be held shall provide a place for the holding of such meetings and shall look after such preliminaries.

12. The Officers of the Association shall be elected at the first meeting held by the Board of Directors, except as hereinbefore provided for.

13. The foregoing by-laws shall come into effect on the eleventh day of January, A.D. 1907, or as soon thereafter as the same shall be approved by the Honourable the Minister of Agriculture of Ontario.

Mr. J. R. Dargavel: The directors on their part have adopted this Constitution, after carefully going over each clause, and I must say we are indebted for its preparation to our Secretary, Mr. Murp'y. He has spent a good deal of his time and his talents in preparing this Constitution, and I hope it will meet with your approval. I beg leave to move its adoption.

The motion was then put and carried.

CREAMERY BUTTER-MAKING.

By J. W. Mitchell, B.A., Supt. Eastern Dairy School, Kingston.

In my remarks upon creamery butter-making I purpose dealing with some of the defective features of our work—some of our sins of commission and omission—and in doing so I feel that I can truthfully claim to be a sympathetic critic.

For us to rest self-satisfied with our cream-gathering creamery system in its present state would be the height of folly. Our butter is not all that it should be, and it is better by far that we note the defects, point out their causes and seek to remedy them.

During the past season I had the privilege of visiting most of the creameries in Eastern Ontario, witnessing the condition in which much of the cream arrived at the creameries, and examining the butter made from the same. Furthermore, a large percentage of the creameries of the Province entered the scoring contest inaugurated this last year, whereby samples of butter were shipped monthly throughout the season to Guelph to be there scored by experts, and I had the opportunity of examining a number of these samples. Not only were they scored when fresh, but they were held for a fair length of time to be subsequently scored and judged for keeping qualities. In addition, we had samples of butter shipped to Montreal from several Eastern Ontario creameries, and there held in cold storage for a reasonable length of time—4 to 6 weeks—after which I examined them in company with an expert from one of the largest export houses of that city. After this and several previous years' experience in connection with the cream-gathering creamery system, I feel that the following facts should be stated, and stated as plainly as possible:

1. While much choice butter is made in our creameries, too much of the cream arrives not in a fit condition for making a prime quality of butter; its flavor is wrong.

2. Too much of the butter manufactured is inferior in quality when first made; its flavor can be no better than the cream from which it is made.

3. Generally speaking, our butter lacks in keeping quality; even if fair in flavor when first made it rapidly deteriorates, and this is a *bad fault* in butter for export purposes.

How are we to overcome these defects?

First, we need *better cream*, and I realize that the obtaining of it is a herculean task. But we must persist in educating and training our patrons to provide better facilities for taking better care of their cream. In many cases the trouble starts at milking time. The milking is done in a dirty yard or stable, or the cows are not properly brushed before beginning to milk, and as a result the milk becomes contaminated from an impure atmosphere or through particles of dirt falling into it. This is similar to allowing weed seeds to be scattered over a clean fallow. The milk in the cow's udder is clean, but if due care is not taken at the time of milking and subsequently impure air and particles of dust gain access to the milk, and carry with them undesirable forms of plant life—weeds, if you will, for this is what they really are—which in their subsequent development produce bad flavors in the milk, cream and butter, just as foul seed will produce a foul crop, or bad yeast produce bad bread. Remember that milk is an ideal seed bed for almost all forms of germ life—these organisms are minute plants. Again, the separator may be in an undesirable place, or it may be imperfectly cleaned, and be a source of trouble, or the cream may be kept in unsuitable surroundings.

The first thing to do, then, is to keep the milk and cream as free of these bad-flavor seeds as possible by the exercise of *intelligent* and *eternal vigilance*.

The next step is to make provision for *rapidly cooling the cream and holding it a low temperature*—say 50 degrees—until sent to the creamery, thus checking the growth of the organisms that do gain access to it. This is *the crying need* in connection with our cream-gathering creamery system today. As proof of this let me cite the fact that the butter that won first place in the last season's scoring contest at Guelph was made from cream that had been properly cooled and cared for at the farm. *It becomes absolutely imperative for our creamery patrons to store ice for cooling their cream.* A great many farmers made the fatal mistake of discontinuing the storing of ice when they purchased hand separators, thinking that the separator would, in some mysterious way, do away with the necessity for storing ice. I have little hope of obtaining a really first class quality of cream for our creameries until the practice of storing ice becomes general.

Make a fairly rich cream, say cream testing 30 to 35 per cent., and you will have more skim-milk, a better keeping cream, less cream to cool, less to haul, and a cream that will give your butter-maker better satisfaction.

Many of our creameries need better facilities for *gathering the cream*. The tanks or cans should be well insulated and well covered. Cover the cans with a good canvas cover. In many instances the haul is entirely too great; that is, the cream is kept altogether too long on the road in summer weather. Where a large territory has to be covered it would be altogether better for one collector to collect the cream farthest away and meet another at a suitable point, than to have the one driver remain on the road all day to cover the whole territory. The cream should be collected as frequently as possible—not less than three times a week in summer. If properly cared for at the farm, collected reasonably often, not kept on the road too long and properly protected in transit, it will arrive at the creamery both clean in flavor and reasonably sweet, and *no other quality of cream will produce really choice butter*.

Many of our creameries are lacking in facilities for properly caring for the cream upon its arrival. *We should like to see all of our creameries provided with coolers*, so that the cream could be cooled to churning temperature promptly after its arrival at the creamery. The creamery whose butter won second place at the scoring contest at Guelph was provided with a cream cooler and every facility for properly cooling the cream upon its arrival at the creamery. I am becoming more and more convinced that every creamery should be equipped with both a pasteurizer and a cooler, and that all cream, especially winter cream and cream the butter from which is to be held or exported, should be pasteurized and passed over a cooler.

If we could but get the cream properly cared for at the farm, and collected reasonably often and under proper conditions, and were to follow this up by pasteurization and prompt cooling of the cream, we would hear no more about the "cream-gathered cream" flavor, and our butter would become Danish butter in quality.

In conclusion I would urge upon the creamery patrons and managers throughout the Province the importance of attention to the following:—

1. Providing facilities at the farm for promptly cooling the cream and holding it at a low temperature.

2. Collecting the cream reasonably often in well insulated, well covered cans or tanks.

3. Avoiding having the cream on the road too long in warm weather.

4. The use of a cooler at the creamery to promptly cool the cream upon its arrival.

5. Pasteurization of the cream—especially in winter and when the butter is to be exported.

We would call special attention to 1, 3 and 4 as we are in crying need of reform along the lines that these suggest.

Mr. Macpherson: There is no doubt there has been great progress made in the cool curing of cheese and cool transportation on the railways and steamships, and it represents the importance of cold storage. I believe that cold storage should continue on to the farmers, and that every farmer should have an ice house for the preservation of his milk preparatory to delivering to the cheese factory or creamery. I believe this Association will approve of the resolution which I am about to present advising every dairyman to provide ice in the winter for summer use. I believe it would be a great advance to make the circle of cold storage complete, and we would have our products kept in cold storage from time the milk left the farmer until the cheese reached the consumer. I think it would be to your profit to pass a strong resolution recommending that all dairymen in this country should provide means for cooling their milk, and, on that basis, I beg leave to move a resolution which I feel sure will be backed up by the approval of this Association. The resolution is to the effect that every dairyman in this country be strongly recommended to provide an ice-house in a suitable position for the purpose of getting the milk cooled in the summer months.

Mr. Glendenning: I have very great pleasure in seconding that resolution. Just before I left home I was told that Mr. Davidson had come out ahead in the scoring contest for the manufacture of creamery butter in the Province of Ontario. I think he should be a pretty good authority when he has taken such a high standing as that. If every man put in ice and cooled his cream properly a much better article could be produced than is done at the present time, and we could produce an article that could command a higher price in the market.

The motion was carried.

Mr. Derbyshire: Another resolution I would like to move is a vote of thanks to those who have addressed us at this Convention: and that the Secretary mail a copy of this resolution to every person who has addressed us, starting out with the Hon. Sydney Fisher, and to every other man who has spoken at this Convention.

The motion was seconded by Mr. Glendinning and carried.

The Convention then adjourned.

Dairymen's Association of Western Ontario.

ANNUAL MEETING.

The fortieth annual convention of the Dairymen's Association of Western Ontario was held in the Auditorium of the Y.M.C.A. in the city of London on January 16th, 17th, and 18th, 1907. The President, Thomas Ballantyne, Jr., occupied the chair at the opening meeting.

There was a very large attendance at the opening meeting, showing that a deeper interest in being taken in the dairying business in Western Ontario. As usual, in connection with the Western Dairymen's Association, a dairy exhibition was held, and for this purpose the commodious City Hall was used. There was a splendid exhibition of dairy products and it was well patronized by the citizens of London.

PRESIDENT'S ADDRESS.

By Thos. Ballantyne, jr., Stratford.

It gives me great pleasure to be with you at this, the fortieth annual convention of the Western Dairymen's Association, and it is with a good deal of satisfaction to myself that I take this, the first opportunity I have had, of thanking you for electing me as your President a year ago. On that occasion I was unable to be present, and when I learnt that in my absence you had honored me with the highest office at your disposal, whilst feeling that I had not merited the selection, I nevertheless determined to abide by your expressed wish and to take up the presidential duties to the best of my ability.

The dairy industry of Canada takes rank with, if it does not even surpass in importance, any other industry in the country; and the prosperity of those engaged in agriculture is the surest evidence of the general well-being. This Association has always had the welfare of the Dairymen as its chief object of existence, and its members can look back over the past with a good deal of satisfaction. It is true we have not yet reached the goal of perfection, but every year witnesses improvement, and in my opinion nothing helps the good work forward so much as these annual gatherings. Here we can compare notes of our past efforts, and catch fresh enthusiasm from the personal touch which comes of meeting men who have, in some cases, met and conquered difficulties like our own.

It is here we can listen to men of authority in the dairy business, men who have achieved distinction, and who gladly and cheerfully contribute to the benefits that are to be gained by coming here and giving us of their best. It is therefore with every confidence that I ask you to do your part in making our Convention the success it will be, by a constant attendance on the meetings, and eagerness in asking questions of importance during the period given over to discussion.

Looking back over the past year, we find that Canadian cheese not only maintains its supremacy amongst provisions imported into Great Britain, but continues to grow in prestige from year to year. One of the best of British authorities reports that, on the whole, the quality of Canadian cheese was in 1906 an improvement on former years. Our cheese-makers are becoming more proficient year by year, and it may safely be said that the weakest point in the dairy industry to-day is on the farm.

However proficient our makers may become, this Association cannot rest until it has induced the farmers as a whole to take the utmost care of their milk. It behooves every cheese maker to do all that in him lies to enforce this aspect of the dairy industry, and with unresting vigilance to insist on the very best raw material. One of the most frequent causes of trouble is the boxes, and in this we seem to make very little improvement. The only hope lies in securing a stronger package, and our cheesemakers can use a powerful influence for good along this line if they will only take up the matter earnestly.

During the past season, the price of cheese has been consistently strong, though there were reactions from time to time, and in spite of the fact that exports were in excess of those of the previous season, a high level was maintained throughout. Various causes are given to account for the exceptionally high prices, amongst others being the revelations touching Chicago tinned meats, a short make in England, and a dry summer on both sides the Atlantic. Whatever the real cause or causes were, it would seem unwise to count on a similar state of affairs during the coming season, although I am satisfied that if our quality is maintained, a very good average in price may be reached.

Turning to the export movement in butter, I find that the results have not been so satisfactory. Indeed the season has been the poorest for several years. The total exports from the port of Montreal show a falling off for the past season of no less than 212,000 packages, representing a shrinkage to the value of $2,600,000. This may be accounted for in some measure by the high prices paid for cheese, making it more profitable to send milk to the cheese factory instead of the creamery. Then our home consumption has played a large part in the market. With the growth of population, and the prosperous times, the demand has been on a larger scale than formerly, all of which has tended to keep up the price of butter.

One of the greatest needs in the butter industry is the maintenance of efficient cold storage at the creameries. It has been clearly established that the lower the temperature, the greater the degree of preservation, and there is nothing else known that has so marked an influence as that of temperature.

The London *Times*, a newspaper whose market reports are exhaustive and discriminating, discussing the characteristics of imported butters, declares that if means were used in Canada to raise the average quality of Canadian butter, it would command high prices.

This means that our butter makers will have to put forth every effort to make and maintain a high standard, or we shall never capture the English market. The example of our cheese industry should act as a stimulus to the weaker half of the dairy industry.

The directors of this Association agreed to assist the Department of Agriculture in carrying on a butter scoring contest during the past season, giving $70 towards prizes. Creamerymen have taken a lot of interest in this contest, and we believe it will help to create more enthusiasm among butter makers generally. We also decided to have our creamery instructors

do some experimental butter-making under creamery conditions. Mr. McDougall spent three weeks at the Glencoe creamery, and the butter made there has been kept in cold storage, and is on exhibition at the city hall for makers to examine.

A winter dairy exhibition is again a feature of our annual Convention, and I am glad to report a larger number of entries than ever before. I consider the display a credit to the dairy industry of Western Ontario.

During the past season the Association has employed the same number of instructors as in the previous year, and the work so successfully carried on then has been extended and improved. The Chief Instructor will give a full report on all these matters at a later session.

During the year a committee of this Association met the Minister of Agriculture for Canada, along with the Dairy Commissioner, in order to discuss the question of securing properly graduated and marked glassware for use in factories and creameries, and progress along this line is hoped for.

I am sure that I voice the opinion of the directors of this Association in uttering a word of appreciation, and saying how very highly we value the assistance and liberality of the Department of Agriculture for Ontario, in carrying on the work of the Association, and this not only in instruction, but in their appointments of two Sanitary Inspectors. I believe this to be a step in the right direction and feel hopeful that in the coming season the Department will see fit to make all the Instructors, Sanitary Inspectors as well.

In conclusion, let me again urge upon you the value and importance of our annual gathering of this nature, where each one of us may, if we meet here in the right spirit, receive valuable benefits which can come to us in no other way, and from which I hope an enthusiasm may be kindled which shall serve to support us through the coming months of effort.

Mr. Barr: You will see that our expenses have increased on account of our winter exhibition and also on account of the scoring contest. The Western Dairymen's Association took charge of all the butter, selling this butter and paying the makers for it, so that the money passed through our hands during the season. I was going to say I am sorry. I am not sorry; but in that passing through we lost in the neighborhood of $80, though I believe that money fairly well spent. We were not able to get as much for the butter as we paid for it; paying for it at the price, in nearly every case, sent in by the butter-makers, so the reason we have such a large expenditure and such a large amount of receipts is on account of the Dairy Exhibition and our butter scoring contest for the last season.

THE USE OF THE MILKING MACHINE FROM A BACTERIOLOGICAL STANDPOINT.

By S. F. Edwards, Bacteriologist, O.A.C., Guelph.

Our investigation with the Burrell-Lawrence-Kennedy milker was of brief duration. The object was only to determine whether pure milk could be obtained with the machine milker under conditions that would make its use practicable upon the farm.

No attempt was made to determine the species of bacteria present in the samples beyond the detection of acid producers and those which liquefy gelatin. Milk procured under even more cleanly conditions than usual,

either by machine or hand milking, will contain a varying number of species of bacteria. Of these, the acid-producing organisms are largely lactic acid bacteria which only sour the milk and are harmless. Organisms which can liquefy gelatin can cause a chemical disintegration of the nitrogenous constituents of the milk, visible to the eye in old milk, as a liquefaction of the curd. During this process products may be formed which are poisonous to the body, causing gastro-intestinal disturbances. Aside from the acid, producers and liquefiers, other species may be present, some inert, while some alone or in associative action with others are apt to produce objectionable odors or flavors in milk, or its products butter and cheese. Disease-producing organisms may be present if the animal is diseased.

As bacteria are always associated with dirt and filth, the bacterial flora of milk, either machine or hand drawn will depend upon the cleanliness of the surroundings where the milk is secured. In this connection it may be said that the conditions existing in the College dairy barn are far better than those which prevail upon most farms.

The Cleanliness of the Milking Machine. From the time the milker was installed until after the test began, a period of about seven months, the machine was cleaned according to the directions issued by the manufacturers. The first samples were taken as the milker was ordinarily operated, the cows being milked by machine and by hand on alternate days.

Of the machine-drawn samples in this first series the highest number of bacteria in any one was 1,208,000 per c.cm. (about 20 drops); the lowest was 203,000 per c.cm., with an average of 500,328 per c.cm. Of the hand-drawn samples in the same series, the highest number was 68,900 per c.cm.; the lowest was 3,200 per c.cm., with an average of 23,583 per c.cm. The relative proportion of acid producers and liquefiers to the total number was approximately the same in the hand-drawn and machine-drawn samples. Every simple of machine-drawn milk showed a very high bacterial content, while all but one of the hand-drawn samples showed a bacterial content comparatively low. In the production of "sanitary" or "certified" milk in cities, the standard established by different health authorities varies from 10,000 to 50,000 bacteria per c.cm. In every case but one the hand-drawn milk was as pure as "certified" milk, while in all the machine-drawn samples the limit was far exceeded.

A series of samples was next secured with the aim of determining the effect of boiling the rubber parts and cover of the milker once a week. The average number of bacteria per c.cm. in the samples taken on days when the parts of the machine were subjected to the boiling temperature for 2 or 3 minutes was 37,962, two of the samples being below 16,000. On the other hand, samples taken when six days had elapsed after boiling the parts, ordinary cleaning being practised meanwhile, showed a bacterial content of nearly 150,000 per c.cm. The results of these tests showed that with extra precautions machine-drawn milk could be secured which compared very favorably with hand-drawn milk, stable conditions being the same. They also showed the futility of attempting to produce pure milk by relying upon a sanitary cleaning of the machine only once a week.

An expert representing the manufacturers prepared the milker for the next samples, spending considerable time and care in getting every part of the machine thoroughly washed, boiled, and steamed. Only two samples were taken, and only the total number of bacteria present was determined. One sample showed 1,407 bacteria per c.cm., the other, 1,776 bacteria per c.cm. These results show that it is possible to secure milk having a very

low bacterial content with the machine milker, but the time and care required to prepare the milker for producing such milk would make it impracticable for any but the large dairy farmer.

Wholesome milk can be secured and bacteria largely excluded by observing a few precautions to prevent bacterial contaminations. The source of these contaminations may be stated briefly as follows:

The Stable. Manure teems with different kinds of micro-organisms, and if allowed to accumulate in the stable a part of it becomes dried, the bacteria contained are thrown into the air by movements of the animals and caretakers, and many of them settle into the pails during milking. Straw and other litter used for bedding contribute a large number of bacteria to the air when stirred, as also does feed of any kind which makes dust in the stable. Bedding and feeding, therefore, should be done at least an hour before milking, or after milking. In short, the stable should be as free from dust as possible during milking, either by hand or machine.

The Animal. As hairs and particles of dirt from the animals carry many bacteria, the cows should be kept groomed, and the flanks and udder should be wiped with a damp cloth just before milking. This will keep much filth out of the pails. A few drops of milk remain in the teats after milking and the bacteria present or gaining access from around the opening of the teat may multiply here to many hundreds from one milking to another. If in milking the first few strippings are rejected these bacteria will be eliminated.

The Milker. The milker should wear clean clothes, have clean hands, and should be a healthy individual. Many cases of typhoid fever and diphtheria have resulted from drinking milk handled by convalescents from these two diseases.

Utensils. All utensils should be first rinsed thoroughly in cool water, washed in hot water containing a little sal-soda, thoroughly scalded or boiled, and kept inverted until ready for use to prevent bacteria falling into them from the air.

All these precautions are equally important in producing pure milk, whether machine or hand milking is practised, and only by their observance can the farmer or dairyman produce pure milk. It remains, then, for each individual, who alone is the best judge of his own conditions, to determine whether he would be warranted in making the outlay of money necessary for the instalment of a machine milker.

Our work may be summarized briefly as follows:

1. It is possible and practicable for the general farmer as well as the dairy farmer to produce pure milk, either by hand or machine milking.

2. To produce pure milk by hand or machine milking, scrupulous cleanliness must be maintained about the stable and animals, the person of the milker and utensils.

3. Strict sanitary precautions being observed, hand drawn and machine drawn milk in our test showed approximately the same average bacterial content.

4. The mere fact that milk is drawn by the Burrell-Lawrence-Kennedy milker is by no means a guarantee of its purity. It may contain many more bacteria than hand-drawn milk under similar conditions.

5. We would not advise the installation of a machine milker, unless the farmer or dairyman is prepared to fulfil the sanitary conditions essential to the production of pure milk.

REPORT ON DAIRY HERD COMPETITION.

Mr. G. H. Barr read the following report:

The directors decided during the summer to offer two medals for a dairy herd competition.

The regulations governing this competition was that no herd of less than eight cows would be allowed to enter, and the prizes be awarded to the patron receiving the largest amount of money per cow from any cheese factory or creamery in Western Ontario from April 1st to October 31st, 1906. Figures to be taken from the factory or creamery books, and certified as correct by the secretary and maker.

Fourteen patrons of cheese factories and one patron of a creamery entered the competition. Two of these failed to send in statements. The following is a tabulated statement of the herds:—

Name.	Acres in farm.	Breed of cows.	No. of cows.	Total milk.	Average per cow.	Total money.	Average per cow.
				lbs.	lbs.	$	$
M. L. Haley, Springford.....	90	Holstein.....	11	71,701	6,512	687 49	62 50
M. H. Haley, Springford.....	100	Holstein grades.....	12	80,259	6.688	733 71	61 14
Jacob Swance, Norwich.....	125	Holstein grades.....	12	79.920	6,660	730 80	60 90
W. E. Thomson, Woodstock .	100	Holstein grades.....	12	80,294	6,691	725 82	60 48
W. E. Mason, Tyrell.....	280	Holstein grades.....	20	134,617	6,730	1,178 34	58 92
Martin Swance, Springford..	125	4 grade Shorthorn, 9 grade Holstein.....	13	82,639	6,256	761 75	58 60
Wm. Bell, Avonton.....	100	Holstein grades.....	9	52,979	5,886	512 37	56 93
Chas. Baird, Motherwell	180	Holstein and Holstein grades.....	16	98,839	6,177	908 79	56 79
Reuben Gleason, Medina	150	Holstein grades.....	24	134,818	5,617	1,302 91	54 25
R. M. Cowing, Listowel,.....	100	6 grade Holstein, 10 grade Shorthorn	16	85,261	5,328	817 37	51 08
(Started sending April 9th).							
W. H. Mead, Lakeside	50	Holstein grades.....	8	37,125	4,640	367 24	45 90
Chas. McCann, Glendale	133	Shorthorn grades.....	9	38,045	4,227	365 49	40 61
Creamery Patron.							
Robt. Bowie, Beachville	50	Not given.....	8	47,464	5,933	448 60	56 07

You will notice that it was not the patron who received the most milk per cow that won the prize, and this is due to the fact that the charges for making are greater in some factories than in others.

If another competition was entered into I believe the prize should be for the most pounds of milk per cow instead of for the most money, as the prices for making and drawing the milk vary so much in different factories and creameries.

I believe the Dairymen's Association would be doing a wise thing to offer a handsome prize for a dairy competition in 1907.

Since awarding the prizes we have received a statement from Mr. Wm. Cornish, Putnam, as follows:—10 cows, total milk 65,524 lbs., average pounds per cow 6,552 lbs. Total money $631.59. Average per cow $63.15.

The Chairman: You have heard Mr. Barr's report on the dairy herd competition, and the best of it is that we have Mr. Haley here with us, who will be able to give us some idea of how he feeds his cows, and any other information necessary.

Mr. Haley: I am sure I appreciate very much that I am the winner of this prize. I did not know last season that I would be called on this platform this afternoon on an occasion of this kind. I not only feel it an honor, but I appreciate it very much, and it is gratifying for me to know that I have accomplished so much in the breeding and feeding of my cattle. I believe I owe a great deal of my success to the teachings of this convention, to the Dairy Institute meetings, and to reading farmers' journals, for all these have pointed out to us the different methods and how to follow them. It is only a few years ago that I started to improve my stock by using pure-bred sires and weeding out the ones that were not profitable, and by keeping records of each cow. I had the figures down here of eleven cows. Mr. Barr has given you the figures, and I do not think it is necessary for me to go over them again. In order to be successful you should breed only first-class pure-bred sires. Feed them liberally so as to develop them. In order to feed or breed for milk you must have animals for that purpose. I believe also in regularity in milking and feeding. I have always been particular about milking at a certain time, morning and evening. I might say all the feed I have fed my cattle has been produced on my farm. I leave the cows dry six weeks to two months, and when they are dry it is an important thing to feed liberally food of a succulent nature to build them up in health, for I believe during that period you are to a great extent fixing the future usefulness of the offspring. Then they are good and strong, and you have a good strong cow after she freshens. I have noticed in some cases when the cow is in poor health that when she freshens the calf has some trouble.

I was asked since coming into this building where I was from, and I might say it is a pride for me to answer that I come from Oxford county. It is a great dairy county. If you want to go into the dairy business you cannot do better than take a trip down in the county of Oxford. We have some of the finest dairy cattle that there is in the Province. I thank you very much for this medal, and I appreciate it very much. I do not think the Association could do anything better to further the dairy interests than the awarding of a prize of this kind from year to year. In our section, and I suppose it is the same in other sections, we had quite a strife to see who could send the most milk to the factory, and I am sure if something of this kind was presented every year we would have some remarkable records.

Q.—How many cows does Mr. Haley keep?

Mr. Haley: Eleven.

Q.—How do you feed them?

A.—Ensilage and meal. Just as soon as the pasture begins to dry up I feed them ensilage and roots in the stable, and meal.

Q.—Had you any heifers among that herd?

A.—Two two year old heifers; but they were extra good ones.

Q.—What kind of grain do you feed?

A.—Oats and peas mixed. I believe it is a great thing to keep cows up in flesh when they are dry. I think that is where a great many people make a mistake. When the cows come in in the fall they are in comparatively good flesh, and when they dry some people just let the cows shift for themselves, and then they start to go down. I make a practice of keeping them well up in flesh all the time.

Q.—Do you feed grain all summer?

A.—Yes, I feed some as soon as the pasture begins to fail. Probably you noticed my brother sent more pounds of milk than I did. He had alfalfa. I do not think there is anything better than alfalfa. I had Hungarian, but I do not think it is as good as alfalfa.

Q.—Do your cows get fleshy?

A.—No; not very much. I do not think a cow can respond very much if it goes to flesh instead of milk. They respond to the feed if you feed them well.

Q.—Give us the average percentage of butter-fat in the milk?

A.—We do not test it. Our cheese-maker is here, he will know.

The CHEESE-MAKER: Your milk had not been tested for butter-fat at the time we quit making butter; at that time your milk was about the average at the factory.

Q.—Holstein milk is rather thin?

A.—It depends on how they are fed. We had a little strife between the men at another factory, and the Jersey man said, "If you drop a quarter into a pail of milk and you can see the quarter that is Holstein milk." (laughter); and the Holstein man said, "If you drop a quarter in a pail, and the milk does not cover the quarter, that is Jersey milk. (Laughter and applause.)

Q.—Do you think it pays to weigh the milk?

A.—It takes considerable time, but we have a little pair of scales hanging on the wall on which we can hang a pail. I think it is time well spent.

Q.—Did you find much variation in the cows?

A.—Not if they are fed regularly.

Q.—On the whole you think it is time well spent?

A.—If the person is interested in improving his stock I think it pays.

Q.—With your eleven cows can you tell the one that is giving the least milk?

A.—I think we can. One of my heifers was giving 40 to 45 pounds a day, and another man had a heifer which he said was giving 40 to 45 pounds, and I said "Did you weigh it?" and he said "No." And I have found a big difference in the 45 pounds of milk that a man weighs and the amount of milk that he does not weigh.

Q.—If you have two heifers in the same herd you know what milk they are giving?

A.—Yes, but I think it is better to weigh it because some cows throw a lot of froth; you think the pail is full, but there will be a lot of froth.

A MEMBER: There has been a lot said about this weighing of milk: the question is whether it is going to pay for the time and trouble.

A.—I would like to have a cow-testing association in our neighborhood. I am quite anxious to improve my cattle, and I would like to know what they are doing.

REGULATING THE ERECTION OF NEW CHEESE AND BUTTER FACTORIES.

Mr. W. K. MACLEOD, Vanneck: There was a meeting of the owners of factories over in Somerset Hall, and they talked over matters of special interest to themselves, and we are here to report what has been done. We recognize the fact that the Association in Western Ontario is a strong power in the interests of making more perfect arrangements which enter into the manufacturing of cheese and butter, and we want, in this case particularly, to have all the influence that we can, to have the sympathy of this Association in this matter, and to ask for your help.

There were a couple of resolutions passed by the owners of factories at the Eastern Dairymen's Association, and when read to the people who met over in Somerset Hall they thought that they expressed their opinion all right, and they ask that they be submitted to the meeting here for discussion and adoption if you thought well. That is what was done over there. There is no intention on the part of these gentlemen at all to oppose the makers or the patrons, or to put prices up, or to be exorbitant in their price, or anything of that kind. Their desire is that they will be able to bring the affairs connected with their business into sympathy with the changed conditions that are going on. All over the country in almost every line of business we see in the papers where expenses are so increased. The expense of living is increased. Wages and the expenses of raw material that enter into the manufacturing of their goods has increased so much, that it is impossible to conduct business in the same way that it was some years ago. As these conditions change people who are in any line of business must change their methods, and change so as to meet existing circumstances. Now that is all that these people wish to do, and they ask the help and sympathy of the Western Dairymen's Association in accomplishing this. I think, perhaps, without taking up any more of your time I would ask Mr. Cowan to address you. I think he will be able to explain the situation much clearer than what I would be able to do, and read to you the resolutions which were recommended to be submitted to you for adoption if it was thought advisable.

Mr. Cowan: Mr. McLeod has stated the case very clearly. In spite of the high prices that have been paid for dairy products, manufacturers and sellers have not been getting the prices to which they are justly entitled. Many of the best makers have been forced out of business. In some cases that has been due to the senseless competition of the manufacturers themselves; in other cases it has been due to opposition factories that have been started by patrons, and these factories not continuing any length of time. I believe I am safe in saying there are several hundred factories in Ontario, the owners of which did not make a living wage this year out of their factories. In addition to this many owners of factories have been ruined by the erection of competing factories in their close proximity. I could give you numerous cases. I presume almost every dairyman here knows that is the case. Take the case of a man who sixteen years ago bought a factory that was pretty nearly run down, spending all his money on it improving it. About six years ago a factory started about a mile and a half away and cut his business almost in half. He managed to keep on, and now they are starting a factory a mile and a half the other side of him. After sixteen years work his business is practically ruined, and he is going out of it. I can give you the case of a man in Oxford County, who, two years ago, paid what he thought was a reasonable price for a factory, got it going pretty well, and the old proprietor came back and told him that if he did not sell out for about the same price as he paid for it they would put up another factory right beside him. It is felt, therefore, that it is time the manufacturers should get together and discuss this matter, and two meetings were called, one in Ottawa, and one here this afternoon. The intention is, not to do anything that will be unfair to the patrons. The best evidence of that fact is that the proprietors have been willing to allow any person to attend their meeting, and they have come over here to discuss this matter with you that they may get your sympathy and support in any movement that may be made.

The speaker then read the resolution in favor of the National Dairy Show passed at the annual meeting of the Eastern Dairymen's Association and said: I might state that at the meeting at Ottawa, not only was this resolution passed, but it was felt that the best way to deal with this matter was to be perfectly frank and outspoken with the patrons of factories, and they decided that the best way to do this was simply to prepare a statement showing the reciepts and expenditures in connection with representative factories, and I wish to publish the statement to the patrons of factories, which can be read at their annual meeting and discussed and considered in any way that may seem desirable. That statement was prepared at the meeting in Ottawa to enable them to give you a clear idea of the situation this afternoon. I think it is well I should read the resolution:

"That it is the opinion of this representative meeting of proprietors and officers of cheese and butter factories situated in Eastern Ontario, that there is no one matter that is retarding the development of the dairy industry in Ontario as much as the merciless competition between factories; and the fact that the owners and officers of factories have no guarantee, after expending perhaps all the money they possess in the erection or improvement of their buildings, that their investments will not be ruined and their labors lost by the erection of a new factory or factories in their immediate vicinity. It often occurs that these new factories are erected by some ill-advised person, or through spite, and that they continue in business for only a few years and fail. During their existence, however, they do great damage to the dairy interests in their sections. We learn that the Government through its sanitary inspectors, contemplates taking action that will compel owners of factories to spend large sums of money improving their buildings to place them in a sanitary condition. While we do not want it to be thought that we desire to block anything that is in the interests of the improvement of the average quality of our dairy products, we feel that it will be unjust for the Government to compel the owners of factories, whether owned by joint stock companies or by private individuals, to incur heavy expense improving their buildings, without giving said owners some guarantee that their investments will not be ruined by the erection of a new factory in their close proximity. We, therefore, desire to petition the Ontario Legislature for legislation at its approaching session that will give the owners of existing factories the right when a new factory is established within a certain distance of their buildings, to apply for the appointment of arbitrators, who shall have the power to determine what damages, if any, shall be allowed to the owners or officers of the existing factory for the injury done their business, and that the new factory shall not be erected until such damages have been paid. We believe that this request is reasonable, and that justice demands that it shall be granted, and that if it is granted it will immediately place our dairy industry on a more stable basis and result in a great and immediate improvement in the condition of the factory buildings throughout the Province."

I feel that the proprietors want something of that kind. They are aiming at a mark, and they want some sort of protection. I am inclined to think that the proprietors would be quite satisfied if the Government would appoint a committee to look into any new factories, and say if it is in the interests of the whole section that a new factory should be established. That was the resolution unanimously passed at Ottawa, and later approved by the Eastern Dairymen's Association, and they have appointed a deputation to wait upon the Government to urge for some legislation along these lines. That is the first matter to be considered and which you will be asked to discuss here this afternoon.

The second matter is in regard to the cost of manufacturing They prepared the statement showing that the factories were not making any profit. They want this statement to be sent broadcast. The more publicity it is given the better pleased they will be.

At the meeting this afternoon the first resolution with regard to arbitration has been moved and seconded. It is desired that they are to be discussed here this afternoon, and that later the discussion should take place with regard to this matter of the cost of manufacture. (Applause.)

Moved by Mr. W. W. Smith, seconded by Mr. A. J. Herrick, that this resolution as read by Mr. Cowan be adopted by this Association.

A Member: I am surprised and disappointed at the proceedings taken this afternoon. I would much rather you would continue the meeting as advertised. This may be of much greater importance, but it seems to me like a little combine among the cheese-makers, and I think we should discuss the milk production, and I would much rather you would continue the programme as advertised.

The Chairman: This subject we are discussing now is of just as much interest to the farmers as the cheese-makers. (Applause). I think it is in their interests as much as anybody else.

The Member: It may be all right, but I think it is a little out of place.

The Chairman: I do not think it is.

The Member: In my case I took the train in to hear the subject of milk production, and it does not interest me as much as the subject billed for.

Another Member: Hasn't a man got a right to start a cheese factory where he likes. This is a free country. Can't I start a factory wherever I like?

Mr. Cowan: I might say there has been a misunderstanding. The cheese-makers were to have met by themselves and discuss their own business, and then come to this Association and ask for co-operation. It was rumored around, however, that there was a misunderstanding, that the meeting over there was a reflection on the meeting here, and the Dairymen's Association decided to extend an invitation to the manufacturers to come over here and discuss this matter. As regards that matter of arbitration, the manufacturers are unanimous that where the patrons of factories think they are being charged too high a price, they are quite willing to give the patrons the right to expropriate that factory.

Mr. McLeod: This business is in the interest of the farmers just as much as it is in the interest of the owners of factories. Because if the owners of factories have their business on a basis that it is going to make it a paying business for them, then they are going to look after the manufacturing of the product in a better way, and eventually it means better prices. So that in the long run it comes back to the patrons, and it is a matter that we patrons and manufacturers and makers should look into. It is a partnership business all around, and what benefits one benefits the other, and that is the reason the matter has been brought up in this way. We hope that any farmers here will express their opinion on this, and if they are expressed promptly the matter will soon be disposed of. It will only take a few minutes, and after this the other matters on the programme can go on, and those men who came here especially to hear this will get the information they are after.

A Member: This matter has been sprung on this meeting, and I do not believe this meeting is ready to discuss that subject, it would give the manufacturers and everybody in connection with it a better chance to speak and a better understanding of the subject if it was put off to another meeting. Nearly everyone here is interested in the subjects that were to be taken up, and I do not think the meeting is just in the temper to discuss that matter now. I believe it would be better handled at another meeting, say this evening. Would it be in order that this be postponed to another session?

Mr. McLeod: I think the suggestion is a good one, and if anybody thinks this matter has been sprung on the meeting, I think I voice the opin-

ion of the makers who were at the other meeting in saying that now the resolutions are read and the matter presented, you should have a little time to think it over.

DAIRY RECORDS.

Mr. C. F. Whitley, of the Dairy Commissioner's staff, Ottawa, then read a paper on "Dairy Records," which already appears in the report of the proceedings of the Eastern Association, page 10.

Mr. Freeman: Have you any way of numbering a herd so that a man can keep a record?

Mr. Whitley: The majority of our men have both names and numbers. Some of them use ear tags. If you have a number of cows they will come in and take their places regularly in the stable.

Mr. Freeman: They do not do that in our neighborhood.

A Member: I have 25 in my stable, and they take their places every time, and you cannot get them to take any other place.

Mr. Freeman: We have no stalls in our neighborhood.

Prof. Dean: In our own herds we use ear tags. We have about 30 cows, and I ordered 100 tags, and each one is numbered.

A Member: Where do you get those tags?

Prof. Dean: They are advertised in nearly all the agricultural papers in the United States—the Dana Ear Tag. It is not my intention to take any part in the discussion, but I would like to emphasize this work which Mr. Whitley is doing. It is on the foundation of successful and profitable dairy work. No man to-day can afford to keep 10, 14 or 20 cows without knowing what each and everyone of these cows is doing, and the only way to find that out is to get a pair of scales and test and weigh the milk at regular periods once in a week or once in ten days and find out which are the profitable cows, and get at the basis of successful and profitable dairying. It does not take very much labor. We have followed that plan for sixteen years in our own herd, and it is the only way you can possibly build up a dairy herd. I think every man should use a pure-bred dairy sire. That is the first thing that the dairy farmers of this country have to do. They have been using grade sires and sires from beef breeds, and the result is that the average production from the cows of Ontario and Quebec is only 3,000 pounds of milk. And why? Because they have been using any kind of sire, and in many cases using just an ordinary scrub sire from beefy breeds; and that is the first fundamental mistake which our farmers have been making.

I have no special breed that I would care to name; but I would like to emphasize the importance of having a pure-bred sire of a good dairy breed. The second point I would like to emphasize is to feed these cows well; not only when they are milking, but after they are dry. The farmers are making a great mistake by not feeding their cows better during the winter. Some men will actually give a cow all the straw she will eat. (Laughter and applause.) The time to build up the system of the dairy cow is when she is dry; for the amount of milk which a cow will give the next summer does not depend on the amount of feed they are given in the summer, but how they are fed in the winter. Many men are keeping them through the winter any old way, and then they expect them to give good results. I consider it is necessary to feed a cow well while she is carrying her calf, in order that that calf should be a good milker. Some men just keep the cows

living during that period, and that is the reason a great many of our heifers never make good milkers. The quality of the dairy cow depends first on the sire, next upon the dam, and then on how these calves are cared for and nourished while they are being carried by the dam. The constitution of every animal, man included, depends on the vitality which they receive at that time. If the calf is not well nourished in the dam it will never be a strong vigorous calf. I would like these three points born in mind with regard to improving the dairy herds of this country. First, use pure-bred sires; second, feed the cows well, not only when they are milking, but when they are dry.

A MEMBER: Who supplies the blank forms for keeping records?

Mr. WHITLEY: The Dairy Commissioner's office will be pleased to send you all the forms you want. I shall be very glad to-day or to-morrow to get the name of any man who thinks there is room in his locality for an association. We are prepared to organize twenty or thirty more associations this year, and if you will let me know or drop a line to the Dairy Commissioner at Ottawa we will be glad to assist you.

A MEMBER: Do we get all the supplies necessary?

Mr. WHITLEY: The Department supplied blank forms, and the preservatives, and does the testing free. The bottles and scales can be procured from any dairy dealer in the Province.

Mr. PAGET: In conversation with Mr. Ruddick some few weeks ago, he said that, where an association wanted to be organized, he would not only send a man to assist in the organization of the association, but that they could get these supplies necessary for the work of that association through the Department, so that they could depend on the reliability of them.

Mr. GLEASON: In view of Prof. Dean's remarks as to the way we should raise our dairy herds, I would like to say that he has made three very important points. I think if our farmers would raise their herds in that way, and feed in the way he says, there would not be much necessity for keeping records. If we would raise our heifers along that line, and feed them generously, then I think the great majority of our cows will be good producers. By weighing only once in ten days you are apt to be wrong, because at the time you take the test the cow might be doing better or worse than usual.

Mr. WHITLEY: I am glad this point was raised, for the reason that while the Department is advocating this way of testing, it does so in the hope of getting a great many farmers to take up the work so that you will be able to weigh every day. It is infinitely preferable to weigh every day, because you get at once at any variation, and you seek for the cause and remove it.

Mr. FREEMAN: There is one thing I do not feel quite satisfied about. We have heard from the Dairy Commissioner that the average cow only gives 3,000 pounds, but I see they include the Province of Quebec. I do not like that. I would like to know what is the average for the Province of Ontario. I think our average would be higher.

A MEMBER: I would like to ask what is the breed a man should raise to get the best possible output of milk. I think Prof. Dean said it did not make any difference so long as a pure-bred sire was used. I am in favor of the Holstein. I have a son who wants to go down to the Agricultural College and he will possibly be under Prof. Dean. I am teaching him that the Holstein is the best possible cow he can buy, and if Prof. Dean says it does not make much difference what kind he gets as long as they are pure-bred that

will make quite a difference. I want to know what is the best possible class of cow to bring the best results from a financial standpoint. I think it is the Holstein, but if Prof. Dean says some other cow, then I want to adopt that cow.

Prof. DEAN: That is the greatest tribute that has ever been paid to me in sixteen years—the fact that a man would be willing to take my judgment on this question of breeds. If I gave the impression that any pure-bred sire would do, I want to remove it. I think I said the main point was to use a pure-bred sire of a dairy breed. Now there are several of the dairy breeds, and when we get on to that question we get on very dangerous ground. In sixteen years we have had five different breeds of cattle under careful testing. We have found the greatest number of profitable cows among the Holsteins. I suppose some Ayrshire and Jersey men will climb on to me for making this statement. What is the reason that there has been undoubtedly a larger number of profitable cows among the Holstein? It is found in the fact that twenty-five years ago the Holstein breeders took up this question of testing their cows, and adopted advanced registry; the other breeders have been paying too much attention to fancy points, breeding for color, and clean-cut muzzles, and fine horns, and slim tails. Do we keep cows to grow slim tails or fine horns? No. We keep them to produce milk. That is the main thing we want with reference to cows, and unless the breeders of every dairy breed of cattle wake up, and they are waking up to the importance of testing their cows, they will find it very difficult to sell their stock.

I was talking recently to two men in Ottawa who are interested in dairy cattle. I was told that one of them had said, when he got hold of Prof. Dean he would give him a good "lambasting." We talked over this matter, and after we got through they acknowledged that this agitation in favor of testing cows had done their breed a great deal of good. Farmers of this country are prepared to pay long prices for bulls from cows that have good records. We have a cow that I consider is the best cow in Canada to-day. She gave us in thirty days, in the month of November, 2,522 pounds of milk, testing 3.5 per cent. of fat. She gave us in seven days 643 pounds of milk, and in one day 96 pounds. In the months of November and December, 61 days, she gave nearly 5,000 pounds of milk. I do not know of how many men have spoken to me for the calf of that cow this year already, and one of our boys, just as soon as the calf was dropped, came to me and said, "What do you want for that calf?" I said "$50," and he said "I will take it."

A MEMBER: What breed?

Prof. DEAN: The Holstein. The farmers are not any longer willing to pay money for bare pedigrees; that day has gone by. The farmers who wish to improve their stock want to get bulls from the cows that have been tested. Like does not produce like. It is just as often that like does not produce like as it is that like produces like. But when you get a cow whose ancestors have been good milkers, then a calf from that kind of a cow will be likely to prove a good milker. It is a fact that only about one out of five of the average heifers raised prove first-class milkers because they have not got dairy blood at the back of them, and you must go back many generations before you can be sure. Only 50 per cent. of the blood of the direct parents goes into the progeny, and the other 50 per cent. is made up of the blood of the ancestors.

A MEMBER: I am very much obliged to Prof. Dean for what he has said. I am going to put my boy under his tuition next September, and if he can teach him what he knows, either by coaching or with a club, in ten years from now I will wear a diamond. (Laughter and applause.)

ADDRESSES OF WELCOME.

Mr. J. C. JUDD, Mayor of the city, delivered a cordial address of welcome.

Mr. WHITE, President of the Board of Trade, also welcomed the association in a witty and hearty manner.

President BALLANTYNE responded in a suitable way.

NATIONAL DAIRY EXHIBITION.

Mr. JOHN N. PAGET presented the report of the committee appointed to confer with the committee of the Eastern Association *re* the proposed National Dairy Show. The report was similar to that appearing on page 100.

In presenting this report to you I do not wish to occupy very much further time. Perhaps there will be others who would like to speak on the subject. After giving the matter a good deal of consideration, and consulting with leading dairymen throughout many parts of the Province, there appears to be a general consensus of opinion that the work of promoting the dairy industry in this Province has, perhaps, reached its usefulness, after continuing along lines similar to what have been followed in recent years. We find that conditions in almost every line are changing with time as it passes. The conditions on the farm are very different from what they were a few years ago. The conditions that were successful in bringing the dairy industry of this Dominion to the place that it holds to-day have been successful, but the question now arises, is it wise to continue along that line, to continue methods that have accomplished their purpose? I believe a great deal of good might be done in holding such an exhibition as has been outlined in the report. I believe that, in maintaining the position that we occupy in connection with the dairy industry, we will have to reach out to the men on the farms and educate them to send better raw material to the factories. The work of this association and of the Department of Agriculture has been largely confined to instructing the men in the science of making butter and cheese, and it has accomplished its purpose. We believe there are a sufficient number of men who are competent to make the finest quality of goods, and we have received some reports from the Old Country that have been very encouraging with regard to the quality of both our cheese and butter. Unfortunately, we have had some reports that were not so encouraging, but I believe there are a sufficient number of men capable of manufacturing fine cheese and butter, if the material from which they have to make these food products is delivered to the factory in the very best condition. In order to show you the benefit that would be derived from holding such an exhibition I have only to refer to the Winter Fair in Guelph, which represents the beef industry in this country. That exhibition is gaining more support from year to year. The number of agriculturists who attend that fair is very large, and there is no comparison between the number that go to a fair of that kind and the number that attend one of our conventions. In going up and down the country I frequently hear the remark made, in connection with the dairymen's convention, that we are going over and over the same old thing, from year to year. I believe that if an exhibition such as a National Dairy Exhibition could be held at a central place, such as Toronto, it would be a great success; but in order that it should be successful it ought to be held at a central place such as Toronto. If we could bring the farmers

together, and demonstrate to them work similar to that conducted in connected with the Winter Fair at Guelph, very much good would be accomplished and very much done to not only maintain but to advance the work. As Mr. Whitley said this afternoon, the work he is engaged in in connection with the cow testing of this country would receive a stimulus, and it would mean dollars in the pockets of the farmers. Mr. Whitley said that our dairy products might be increased to $30,000,000 annually. If that is the case, and I believe it is, I think the time has arrived when we had better get out of the old rut and adopt methods that will be more advanced, and will further this great industry, and I do not know of anything that would be better than the holding of a National Exhibition, such as has been outlined in this report to-night. (Applause.)

Mr. H. B. Cowan, editor of *The Canadian Dairyman*: In consideration of this question it seems to me there are two things we ought to look at. First, is such a show needed? I think every person will admit that the time has come when we will have to specialize along agricultural lines. For several years I have had the privilege of attending meetings of the directors of both Eastern and Western Dairy Associations, and I have found they have both been confronted with the same difficulty, "How to arrange their programme so as to secure a good attendance at their Convention?" They have put up one afternoon for the dairy farmer, another session for the creamerymen, another session for the cheese-makers, and they have found it difficult to make this session sufficiently interesting to attract the crowds they would like to have present. This has been particularly the case as regards dairy farmers.

At the Eastern Convention last week I heard Mr. Kidd, who lives right close to Ottawa, remark that he could see only one dairy farmer in the Convention that he knew who came from the country around Ottawa. There is a feeling that the dairy interest in the Province is rather limited. There is a place between Eastern and Western Ontario where they have not gone into dairying to any extent. Both the Eastern and Western Association have had the same object in view. Both have felt frequently that they would like to be in closer touch one with the other, but have not known how to go about it. Another section of the dairy industry that we do not hear about at all in connection with this Convention are the dairy stock breeders. The breeders of the Holstein, Ayrshire and Jersey cattle hold annual meetings, but they never come to this Association, although their interest are almost identical. There seems to be a feeling that the time has come that the cheese-makers and butter-makers should have an organization. The cheese-makers have an association in Wisconsin. They receive a grant and issue an annual report. All the cheese-makers attend from various parts of the State. We do not know in Western Ontario the conditions that exist in Eastern Ontario. Mr. Paget was on Institute work in Eastern Ontario. He was surprised to find that they had 22 cheese factories in one section down there ten miles square. They had some cheese factories there that make only one cheese a day. I was told that at one factory they made cheese one day and they stopped for a day and made the next. If we can get together and give the Eastern men a chance to find out what we have here in the West, we might expect better results.

The second question is, "Can we make a success out of the Exhibition if we attempt to hold one?" You will recognize that this is important. Perhaps the best reply to that is that shows of this kind are held in New Zealand, United States and Great Britain. I have in my mind a report of the New Zealand show, and the exhibition of cheese and butter and dairy

produce have been increased from year to year. I also have in my hand the report of the Butter-makers' Association in United States, and a report of the show in Great Britain, and they are very interesting reading. They hold all kinds of competition in butter-making and milk. They bring in all the dairy interests, and the fact that these very countries have been able to make a success of their Exhibition would seem to indicate that we ought to be able to make a success. When the Winter Fair was first held there was a feeling that it would not be successful. There were a lot of men predicted that it would not grow, but it is growing every year. We have an example in the Horticultural Exhibition. I had the misfortune to be the Secretary of that Association, and a number of people said, "You cannot make a success of that show." We have not had as large an attendance as we expected, but the results that have been accomplished have been astonishing, and the attendance is doubled since the first year.

I think we could make a great success of the dairy show. We hear a great deal about testing dairy cattle, and this is one of the most important questions before us. A dairy show would bring out high class cattle and we could hold dairy tests at the show. We would have a good show of such animals as Professor Dean told us about that produced 12,000 pounds of milk.

These are facts that every farmer would have an opportunity of learning. We would have the producers of these cattle at the meetings, and have them on the platform and have them discuss the different points, and we could have leading speakers from the United States as well as our own Professors. These are some of the thoughts that occur to me in answer to these two questions "Is it needed?" and "Can we make it a success?"

Mr. BARR: Do they recommend one central board to conduct the entire business of the Province? I think that is something we should discuss.

Mr. PAGET: That matter was considered by the commtitee, and the opinion of the committee was that while such an exhibition at a central place apparently is needed, it would not be in the best interests to conduct the exhibition without having local organizations both in Eastern and Western Ontario for what might be considered the field work,—coming in contact with the local conditions of both parts of the Province. But for the fair a central organization might be elected similar to what has been adopted in Eastern Ontario during the past two weeks; that is, that a representative should be chosen by the dairymen in a certain district. The territory covered by the Association of the Eastern Ontario was recently divided into districts; a meeting was held in each district to nominate a representative whose nomination would be ratified by the convention held in Ottawa. I think it was in the minds of the committee making this report that some such plan should be adopted whereby the dairymen in every locality would have a voice in constituting this executive board.

Mr. COWAN: This Dairy Show would be conducted very like the Show in Guelph; the Western Association and the Eastern Association to appoint delegates, and the Stock Associations would appoint delegates to the fair, and the work of the Eastern and Western Association would go on the same as before.

Mr. BARR: I have been giving this question some thought. If the arrangements were so that we would have a Central Board in Toronto to manage our National Exhibition and still leave the field work in Eastern and Western Ontario under the supervision of the present Associations, and the Associations to devote more of their time to holding district meetings and trying to make them larger and more interesting, it would be a good

thing. We could have ten meetings distributed over Western Ontario, and if the Association spent their efforts along that line, I believe it would be to better advantage than the way we are doing at the present time. I believe we could offer a prize for a dairy herd competition in each section. I do not think that the work of the dairymen in Ontario ought to be managed and controlled by a Central Board from Toronto, but if we would devote our efforts largely to field work and drop our conventions, I believe we would be doing better work.

Prof. DEAN: If I understand these Winter Exhibitions are to take the place of the meetings held by the Eastern and Western Dairy Associations, I would hold up both hands for it, because going to Ottawa one week and coming to Western Ontario the next week breaks a good deal into my work at the school, and I see no reason why one meeting would not do for both Dairy Associations. I see no reason why the Dairy work of the Province of Ontario could not be managed by one Dairymen's Association. I never could see any reason for having an Eastern and Western Dairymen's Association. This country is surely broad enough in its ideas to do away with these petty local jealousies which are found more or less east and west. Surely we have enough broad minded men to take hold of that dairy question and have the dairy business of Ontario managed by the one board.

A MEMBER: At what time of the year would it be proposed to hold that meeting?

The CHAIRMAN: Some time during the winter, but after the beginning of the year.

A MEMBER: It is not the intention to hold it during the Fair at Toronto?

The CHAIRMAN: No. I would like to have a standing vote. I would like you to show the Minister of Agriculture who is here the feeling of this meeting.

The report was carried unanimously.

SANITARY INSPECTION.

Mr. T. J. DILLON, Sanitary Inspector, reported as follows: All of us who handle milk products know that everything in connection with it should be clean. The man who milks the cows should be clean, the food and water given the cows should be clean, the utensils used and the place where the milk is kept should be clean and sanitary, and, by no means the least, the place where they manufacture the cheese and butter should be clean and sweet. Old rusty cans should not be used for the purpose of carrying milk.

The butter in Western Ontario could easily be made worth two cents more a pound by a little more care. The people pouring into this country, and the local demand, is taking nearly all the butter we manufacture; some day there will not be such great demand for cheese, but more demand for butter, and then we will find where we are at in connection with the butter trade. We are not producing the finest butter that could be made in this Province, and it is time we were thinking about making better butter. People who know something about it will tell you that the butter manufactured in Western and Eastern Ontario is not as fine a quality as it might be, and we should make the best.

When I started out in the summer I thought that there would be four or five patrons in a factory that would require a sanitary inspector to look

over their premises. . The man in charge of the factory ought to be able to get almost every patron reasonably right with the regard to sanitary inspection. I found a great percentage of these factories where there are more than five or six patrons requiring a sanitary inspector. They should be all clean and tidy and up to date. Milk is an important article of food.

It costs money to produce milk, and it is surely worth while to take care of it after going to the trouble of producing it. I found cheese-makers using a bad smelling, old milk starter, putting it in milk that was already over-ripe. That is the cause of a great deal of waste. In districts east of Toronto, I found that some cheese-makers were cooking the curds up over 100 degrees; one man was cooking the curd at 108 degrees. There is a lot of good stuff that goes out to the whey tank, the butter-fat is run off to the whey tank, and you have then a dry, hard flavored cheese. The cheese made from over-cooked curd is seldom insipid, but never fine. In many cases it takes a half pound more milk to make a pound of good cheese than it should. I would say this is rather expensive; there is a large percentage of waste. It is an old saying in Ireland that "the pigs pay the rent," and they will pay a great deal in this country if they are kept right, and if the waste at the factory was used up. It would pay the factorymen to employ somebody to see that the whey tank is kept clean.

There has been much boasting about the quality of Ontario cheese in the last few years. A number of our people, think we are making cheese of as fine a quality as can be made, but unfortunately that is not the case. I have seen English and Scotch cheese made under the same system as ours selling at from 78 to 80 shillings per cwt., when ours were selling at 67 and 68 shillings, and that is quite a difference. Some of the difficulty may be accounted for by the local conditions. We can overcome some of the conditions by cool-curing our cheese, and by having better transportation facilities, but the main part must be overcome by the milk producer and the manufacturer. Our dairymen are better organized than in any other place in the world. We cannot reach perfection, but there is no reason why we should not work as near perfection as possible.

There was a move made last spring to get after the careless men by appointing two sanitary inspectors, and we were given authority. The sanitary inspectors were employed for about five months in the year to visit the factories and the careless milk producers in the Province. Ninety per cent. of the factories visited were in good shape. Two men might have covered the ground had some arrangements been made with the instructors whereby the Inspectors could have been placed where he was most needed, but it is simply impossible for two men to visit all the factories in this Province in the summer season. Some recommendations have been made by the Eastern Association and this Association that all the inspectors should be made sanitary inspectors. The matter will come before the Legislature at the coming session, and if they are all made sanitary inspectors, we will have about forty, and these men would be able to do the work more thoroughly than two. The very first question that would come up would be, "Are these men capable of doing the work?" They will be given the power of judges, and they will be called upon to decide many questions in connection with the work, and whether they are all fit for the position is the question. It is to be hoped that they will do their duty regardless of what anybody has to say, and I hope they will be able to decide questions between man and man, because, once these decisions are given they cannot be undone.

Mr. Geo. W. Neely, M.P.P.: You are gathered here from the different parts of Western Ontario, for the purpose of doing each other mutual benefit, and when men put forth their energy as you are doing, I am sure you will meet the success you deserve. Men whose interests are identical can always benefit each other very much by interchanging opinions. I am sure I have been edified since I have been here, by listening to the different speakers, and those of you who hold a more comprehensive idea of the dairy business would likely gain more information than I would. I was very much interested in listening to Mr. Whiteley, who so ably advocated the testing of cows. I think that is along the line that will effectually redound very much to your credit. I think this particular phase of your educational work is going to produce a great deal of good.

As an illustration of the benefits that might be derived from continual testing, I might call attention to the history of the American trotter. These horses are now all sought for all over the world, and their success has been largely brought about by keeping accurate records and conducting tests under authoritative conditions, so that there could be no disputing the facts, and when Mr. Whitely tells you that Denmark and other countries have produced cows that will give 10,000 and 11,000 pounds of milk in the same period that cows in this country give 6,000 and 7,000 pounds, that should be some incentive for the dairymen of this country to continue along this line. I can assure you that is the very mode and manner by which you will develop this class of cows the best.

Some men object on the ground that there will be a great deal of trouble testing, but I can assure you that your trouble will be repaid, and it is much more important to test where you have a large number than where you have a few, because only in that way can a man keep in touch of a whole herd of cows, and by testing he will become interested in his work, and he can weed out the cows that do not pay him.

Another matter that I see cropping up in the dairy papers, is that of sanitary inspectors. At the request of the Eastern and Western Associations, the Government appointed two sanitary inspectors, in order that the factories might be put on a sanitary basis. I have driven throughout this portion of Ontario, and I have frequently noticed cheese-makers drying their cloths out in the sun, and I think that is a very careless and slovenly looking habit. If the factoryman is not clean, how can you impress upon the farmer the necessity for cleanliness? It has been advocated that the instructors should be sanitary inspectors. If their usefulness has ceased, then I think it would be better to cut them off altogether, rather than clothe them with the authority of inspectors. I feel that if you would make the instructors inspectors, their duty as instructors would about end. I think the cheese-makers ought to exercise a great deal of care in educating their patrons as to what cleanly and sanitary conditions ought to be. They ought to visit the barnyards more than they do, and try to instruct the farmer as to what should be done to make things more sanitary; and if they would do that I think they would find a great deal of improvement. I think neighboring factories should be honorable with each other. If a cheese-maker tries to correct a patron who is on the border line between two factories, the patron may say, "I will go to the other factory," and if the other factory holds out a welcome hand, that patron is lost. I think factories should be more honorable with one another. I think we should make a more uniform article, and if the cheese were sold on their merits we would get a better price for those in the best factories; but our cheese are all sold as Canadian cheese, and if a grocer gets a poor cheese from one

factory, it is all Canadian to him, and he discounts all Canadian cheese, and therefore we must look well to the quality of the product we are producing.

You cannot keep the farmer too closely linked with you. There is a tendency to create a sort of close society in connection with these matters, and to separate yourself from the farmer. You should go the other way and keep close to the farmer. (Hear, hear.) Cheese-making is one of the ramifications of the agricultural industry of Canada, and you cannot do any good by getting away from the source, or the man who produces the milk which you manufacture. I have often thought that the cheese-maker thinks he is a different class of man from the farmer, but that is a mistaken idea.

The CHAIRMAN: The next thing on the programme is an address by the Honorable Minister of Agriculture, and we are delighted to have him with us. Since he has been Minister, the Association have had the best of thought from him, and whenever we have approached him, no matter how we approached him, we have always been received in the most kindly way by the Honorable Mr. Monteith. I am sure he is delighted to come and meet with the dairymen and give us some advice.

ORGANIZED AGRICULTURE.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I am sure that I can say with a great deal of truth that it is a great pleasure indeed to be here. First, because of the gentleman who is holding that noble and dignified position of presiding officer over this splendid organization known as the Dairymen's Association of Western Ontario. It is not the first time a Ballantyne has been honored in that way. (Applause.) His worthy sire was one of the pioneers in this great work of dairying. He was one of those who early saw a future for this great industry that stands for so much, and has done so much for agriculture in this fair Province. I am glad that he has lived to see the fruition of his prophecy.

We are indeed singularly fortunate in being asked to meet in this splendid city. It is a privilege and a pleasure to me especially to come back again to this old city of London, where as a boy I spent a few winters trying to add to my store of knowledge. I have been singularly fortunate in having the glad hand of fellowship extended to me by agriculturists throughout this Province, irrespective of political sentiments. I am glad that they recognize that the great Department of Agriculture should be, as far as possible, divorced from active political influence. Agriculture has a record in this Province of Ontario, and I feel that I have a great responsibility in keeping it up to the high standard it has attained in the past.

Organized agriculture is not a thing of yesterday. You can go back over one century in the history of this Province and trace back organized agriculture. Shortly after Government was organized, a society was formed in the Niagara District, although I do not doubt that some agricultural ideas were transported by those loyalists who settled along the western shores of Lake Ontario, and possibly were put into practice prior to that date. However, one of the historical events relating to agriculture, that we are sure of, is the organization of an agricultural society, or a society for the promotion of agriculture in the year 1704, down in the Niagara District.

Since then I think I am safe in saying the progress has been steady—fitful at times, accelerated at others. We are to-day in the proud position that we can say we are producing a greater amount of agricultural value than we have attained previously. This great industry has accomplished much to allow us to make the progress that we have. You will note its steady progress. It was largely through the Agriculture and Arts Society, an organization that in its day did much in furthering the science of agriculture. Later came upon the stage an honored citizen of this city, the Hon. John Carling, who planned out our Agricultural College to some extent, an institution that was erected for the purpose of experimenting along agricultural lines. Later on the work was well carried on by the Hon. John Dryden, and the men whom he gathered around him. Now, we have come to a position of affairs where your humble servant has to take up the work, and I tell you frankly that the Agricultural Department to-day is a very wide-spread institution. It touches a great many things that come very clos home to the average citizen of this Province of Ontario. We have the two great dairy organizations, the Eastern and the Western, and while I am not in a position to say what you should do in the way of uniting, I can say that you are maintaining, under the present condition, a fairly high standard of output. You heard what was said in Ottawa just the other day by Prof. Robertson and Mr. MacLaren, M.P. They stated that they saw no reason why the present position should not be maintained, provided that you keep up the good quality of cheese; and I believe I am safe in saying that we can maintain the high prices for the production of our fields and flocks and gardens, and for every other agricultural production. The home consumption is beginning to have an appreciable effect upon food values.

These are some of the things that, to my mind, give us a good deal of encouragement to do better in the future than we have done in the past in the line of producing articles of excellent quality; because quality means so much in increased values and increased consumption. Now, it is said that we are spending a good deal of money. The Government of the day are your servants, and they spend the money coming from the consolidated revenue and the subsidy paid by the Dominion. We are the medium through which those vast sums of money are supposed to be spent for the betterment of the people of this Province. The Department of Agriculture to-day has the responsibility of paying out, almost a half million dollars. Last year our appropriation amounted to $460,000. That vast sum of money has been paid out in many ways, yet every dollar of it requires to be justified under our system of Government, on the floor of the Legislature. So that you see the responsibility all comes back to your humble servant as paymaster. The dairy industry is receiving, almost directly, a large part of that vast sum. Last year the dairy branch in its numerous ramifications received about $65,000. As you are well aware, there has been somewhat of a change in the method of expenditure. There was a time when the two organizations, known as the Eastern and Western Dairymen's Associations, dispensed and paid out, to a large extent, the appropriation given for dairy purposes. At the present time, outside the expenses of holding your convention, the other accounts are largely arranged from the Department, and Mr. Putnam, who has charge of that branch, to a large extent, has the responsibility devolving on him of seeing that the details of this matter are properly worked out.

We have under consideration here to-night the question of holding a National Show, and the evidence seems to be all on the one side. No one

has pointed out the difficulties that might arise from this momentous experiment, which we have been urged to undertake. I am often called upon to give advice. I honor the farmers of this county, I revere them, because of that sturdy manhood, of that quality of stability that is in them, that goes to make up a progressive and aggressive people. The farmers of this country are slow to move. I do not mean that they do not work rapidly, because I know that a great many of them work a great deal harder than people who live in the cities. They are not a people who go abroad very much. They are not given to leaving home. I can just tell you, from my experience, that, if you can get them out to one winter exhibition through the year, you are doing very well.

You remember the story of Mahomet and the mountain. He ordered the mountain to come to him, and when it did not move he said, "If the mountain will not come to Mahomet, Mahomet will go to the mountain." This is the position of the farmer, and my idea is that you will pretty nearly be compelled to bring the two shows to the farmer in order to get him to attend. While I believe in specializing, yet I believe that it would be well if we could arrange to have our exhibition consolidated, and have a horse show, dairy exhibition, stock exhibition, and a poultry show, and have them centralized, as reasonably as possible, so that, if a farmer went out for a week, he might see all of them; because that is the way farmers are beginning to do regarding Guelph. They go there and study poultry and live stock, and they spend a week there, and in many cases, this is the only outing some of our farmers take through the whole year. It becomes an educational outing; and if you are demonstrating the dairy industry at some central point, so much the better. But do not try to cover too much ground. Do not get too many shows, or you will lose interest in them. Much hard exertion is required to reach the people. Much unselfish effort must be given in order that the people of this Province may be roused up to the responsibility in the line of production in this great industrial chain.

I think, that, after all, the most important man is the man behind the cow. He is the starter of the whole machine, and I believe the farmers should waken up in the matter of selection. It is well to show a man how this selection can be carried out more expeditiously than in the past. The farmer is beginning to weed out the poor cows, he is beginning to realize that many of the cows are not giving the quality of milk that they should. He has a great responsibility upon him in giving the cheese-maker a good article. On the other hand, the maker is responsible to the patrons, and if he receives any information from time to time it is his first duty to communicate that information to his patrons, and point out the methods whereby the production of the cows may be increased. Advise them as to the wisdom of having a continued suppy of fodder, and as to housing the cows in a more comfortable way as to ventilation, and a great many other things. In fact the cheese-maker is a great man in the community if he rises to his responsibilities. He can become a leader and a benefactor. I believe many of our young men who are taking up this work as a life work are destined to do great work along this line. Then we have responsibilities at our end of the business, because after the farmer and the maker then the responsibility is up to the Government. I feel that it is the duty of the Local Government to do the educational work, get the latest ideas that have proved profitable in the industry, and put it in the hands of those who can spread the knowledge. The Federal Govern-

ment have the responsibility of seeing that there is a constant chain of communication between the manufacturer and the consumer, and that there is no loss of quality in handling it to the consumer in the old land.

I am glad to be with you, and to hear the discussion we have heard here to-night. It has somewhat prepared me for the duel that will be fought out when your delegation comes along. Let us ask ourselves, in mutual confidence, "Are we ready to take that step?" To my mind we have possibly over-stepped the mark. It was brought to our notice at Ottawa as to our right to inspect, as to whether we have not exceeded our jurisdiction in that. Some factorymen say, "You ordered us to make several alterations and changes in our factory, and we feel that when you demand that we should do certain things, we should get something in return. We feel that you should in doing that designate that we have certain rights in certain premises, that we should control the making within certain districts." That is one of the arguments produced, and while it may possibly be to our best interest, yet one begins to realize the difficulties that would be met with. Let us take it into our consideration to go the whole length of licensing factories, compelling them to pay so much as a license fee. Go still further, and compel the makers to have a license. Have every instructor an inspector. These things all lead out to one or two possibilities, and the question is, are we ready for them yet? The results would be rather a campaign of compulsion. I think possibly our campaign of education might be carried a little further, and the public mind prepared for these things before we grapple with them aggressively. I do feel that, at the present time, sanitary inspection has become almost an absolute necessity. Our inspectors have carried on their work without a serious amount of friction. It has been a notable fact that those to whom the responsibility of sanitary inspection rightly falls, namely our local Boards of Health, have failed to a very large extent, in compelling factories to come up to the proper requirements, hence the necessity of having legislation to deal with this matter to some extent. There is an argument in favor of the owner of the factory and he may have ground for complaint. Inspectors have it in their hands to compel the producer to come up to a certain standard in the matter of production, and thereby relieve the maker of the responsibility of jogging up his patrons. It appears to me that, as yet, we have not accomplished all we wish in regard to factory inspection, but I think it is worth while trying for a year or so further, before we attempt to make every instructor an inspector. I am afraid that bond of confidence that has sprung up between the maker and the instructor, would be sadly shattered should a change be made in this regard. We had better experiment with a lesser number than with a greater for a short time at least.

These are a few simple facts that struck me, I being the one who has to bear he brunt; because, after all, the money expended in these things is the people's money, and we are responsible to the people for every action that is taken; so that you can understand the need for caution on the part of a public man. I am only one of a number, although in matters dealing with my Department, as a rule, what I say is somewhat of law. I have always found the dairymen to be moderate in their requests, and I have always felt that it was one of my first duties to see to it that this great dairy industry, that has become the backbone of our great agriculture, should be well considered, but that, as far as possible, nothing should be done to cause a reaction or a backward step. (Applause.)

NOMINATING COMMITTEE.

The following gentlemen were then appointed as a Nominating Committee: Robert Murray, James McIlwraith, George Boyes, Alexander Clark, Wm. Waddell.

REPORT OF INSTRUCTION IN 1906.

By George H. Barr, Chief Dairy Instructor, Strathroy.

I take much pleasure in presenting my annual report of instruction in Western Ontario. The season of 1906 is one which dairymen will no doubt long look back to as a great year for high prices for cheese. The Instructors will remember it as a year in which a lot of hard work was done by them on account of the very hot spells we had, and I want our cheese-makers to remember it as the year they did better work than any previous year in the history of the trade.

At no time during the season did our makers get *off the track*. Notwithstanding the dry hot spells, which were frequent, we had scarcely any acidy cheese, which is the first year since taking charge of this work that I am able to make such a statement. Fewer cheese have been rejected than in any previous year. I will not say that the quality of our summer cheese was finer than a year ago, but I will say that taking the weather into consideration our makers did better work than a year ago and our fall goods were never finer.

Without a doubt, our cheese-makers are handling over-ripe milk better than they ever did. They are also selecting the milk closer at the weighing stand, returning that which is tainted and over-ripe, and I trust they will still continue to improve in this respect. But even these improvements will hardly account for all the success of the past season.

I believe the fact that our buyers have taken the cheese out of the curing rooms earlier that they used to has something to do with improvement in quality. No doubt many cheese are shipped out too green and are a detriment to the trade; but the main point to note is that our cheese must not become heated in any way, and this should encourage our factorymen to put up cool curing-rooms as quickly as possible, so that our cheese may be kept safely at the factories until they are well cured before shipping. Proper curing-rooms at the factories would mean less tendency to ship green cheese.

I will not weary you to-day with the details of our instruction work which will be given fully in the Convention report.

A summary of these details show that 161 factories were visited regularly by the Instructors, 10 less than in 1905. 873 day visits were made and 398 calls, making 1,271 visits made to the factories, which is 366 more than in 1905. 2,648 curd tests were made, 20 more than in 1905. 43,730 Lact. tests, 6,420 more than last year. 2,594 Babcock tests, 1,524 more than last year. 505 patrons were visited, 85 less than in 1905. You will thus see that our instructors have been doing more milk testing than last year and less work among the patrons. This is not their fault, as they were anxious to visit patrons, but could not always make arrangements with the makers or factory men.

The Instructors felt very much discouraged with the results of visiting farms in 1905; there were few improvements made in regard to moving milk

stands or in the method of taking care of the milk, and tainted and overripe milk was still being sent from these farms, no attention having been paid to the suggestions made by the Instructors.

It may seem somewhat arbitrary and harsh to compel this kind of patrons to change their methods, but I believe the milk sent to cheese factories by such patrons is doing so much injury to the quality and quantity of our cheese that some such action is justifiable.

During the year I attended 41 annual and special meetings. 21 annual meetings were attended by the Instructors, making a total of 62 meetings with an attendance of over 3,000. Attending these meetings I consider of very great value to the industry. At no other time can we reach the patrons as well as at the annual meetings, and a friendly discussion with them regarding the care of milk has made wonderful improvement in the quality of the milk delivered during the last season.

The total expenditure for repairs and new factories was $28,750, or $6,283 less than last year. There is a decided improvement in the floors of our factories, and the equipment is improving as fast as profits will allow. The worst feature about our cheese factories is the whey tanks, and it is difficult to know just what to do to remedy this defect. I would strongly recommend that the dirty washings and slush from the factory floors be run into either a separate tank or drain.

I would also recommend that there be only one tank in the ground, and it should be made shallow, not more than four feet deep, so that a drain may be run from under it where possible, so that it can be cleaned out easily, and the whey elevated to a larger tank to load from.

There has probably been a greater improvement made in the milk cans than in any one thing during the past season, and where the cans are improved the quality of the milk is also very much improved. We must still keep up war against rusty and unclean cans. *Clean whey tanks* and *clean cans* are the two things essential to securing a pure milk supply.

In the cleanliness of the factories there is still room for improvement. Many of the curing-room shelves are not kept clean, thereby staining and marking the cheese, giving them a bad appearance. There could also be a decided improvement made in some places in the tidiness of the curing-rooms. Many of our makers spent a good deal of time in the spring painting the piping and equipment and whitening the walls, and I am pleased to say this feature is growing rapidly.

I have heard very few complaints about boxing the cheese. We still have too many poor cheese boxes, but I believe our factory men are making an effort to get a better box.

During November and December district meetings were held in each instruction group. These meetings were very interesting, and we trust helpful in promoting a better feeling among factory men and makers as well as giving us all a wider and more liberal view of things relating to the dairy industry.

The subjects which seemed to be of the most interest to those attending these meetings were: The advisability of making the Instructors Sanitary Inspectors, testing milk for adulteration, better prices for manufacturing, and dividing territory between factories, or having an understanding with one another in regard to the returning of milk. At four meetings a resolution was passed and signed by 42 factory men that they would make an effort to divide territory, and agree to leave one another's patrons alone. Since the meetings were held I have letters from 13 factory men who were not at

the meetings approving of this proposition. All the meetings passed resolutions approving of making the Instructors Sanitary Inspectors in 1907.

I again commend and thank the staff of instructors for the efficient manner in which they did their work during the season. Many times the work is difficult and trying, but there have been scarcely any complaints made to me during the past season regarding the Instructors' work.

I am sorry to say that several of the staff have resigned and entered into business for themselves, but we hope to secure capable men to succeed them.

The relation between myself, the Instructors, and the Board of Directors has always been of the most pleasant and helpful nature, and I can say the same in regard to the cheese-makers, factorymen and buyers.

Group.	Instructor.	Number of Factories Visited	Number of Visits.	Number of Short Calls Made.	Number of Curd Tests Made.	Number of Lactometer Tests Made.	Number of Babcock Tests Made.	Number of Patrons Visited.	Expenditure.
Ingersoll....	Jno. H. Scott...	23	118	82	279	4518	581	102	$8240
Woodstock .	Frank Herns....	21	115	83	337	4672	28	115	5685
Simcoe	Geo. Travis.....	21	120	23	112	6474	194	13	850
Brantford...	R. H. Green....	22	116	46	145	6721	651	13	3395
Stratford ...	Alex. McKay...	22	127	51	592	4980	248	78	3470
Listowel....	J. R. Burgess...	20	110	81	494	6539	114	83	1630
London.....	W. Waddell....	22	118	30	596	7334	688	54	4410
Kincardine .	E. N. Hart.....	5	29	2	191	1935	46	47	1070
Outside Factories .	Geo. H. Barr....	5	20	.....	2	557	44	.....	.....
	Total.....	161	873	398	2648	43730	2594	505	$28,750.

Instruction in Creameries, 1906.

This year there were seventy-four creameries in operation in Western Ontario, three more than last year. The new ones are Glencoe, Lucan and Wheatley. Fifty-three were visited regularly during the season, the same number as last year. Calls were made at eight of the others by the Instructors.

Out of the seventy-four creameries in operation only five can be called separator creameries, and even at these there is a small quantity of cream gathered cream received.

Eleven others are skimming some milk but cannot be called separator creameries, as the quantity of cream gathered is about as much as that separated at the creamery. The balance, fifty-eight, are entirely cream gathering creameries.

In 1904 only thirty-four creameries were using the Babcock tester; in 1906 fifty-six were using it. My own opinion is that it would be a good thing for the creamery industry if it were made compulsory to use only the Babcock tester for testing cream at the creameries, as its use tends to improve the quality of the cream.

Only one creamery (Brussels) in Western Ontario, and so far as I know the only one in Canada, has adopted the method of weighing the cream sample for the Babcock tester. The proprietor, Mr. Harris, is very much pleased with the results in that his patrons are much better satisfied with the tests.

One creamery (Walkerton) paid a small premium to the patrons for delivering cream testing 25 per cent. and over. The result was a considerable increase in the percentage of fat, and an improvement in the quality of the cream. These things show that some of our creamery men are becoming more alive to the importance of advancement in the methods of managing their creameries.

I am very sorry I cannot say there has been an improvement in the quality of the butter in 1906. This fact I believe is due to the warmer weather during the season, and also that some of our creameries are only collecting the cream twice a week. The reason given for collecting only twice a week is they are able to cut down expenses and are able to pay a little more to the patrons than their opposition.

This feature if continued will result in giving our butter even a worse reputation for *old cream flavor* than it has at present. In looking for a reason why our butter has not as high a reputation for quality as our cheese from Western Ontario, I am forced to the conclusion that our creamery men have not set as high an ideal of perfection in quality, and made everything count for that end, as have the cheese men.

Until our creamery managers come to some understanding with one another in regard to the question of refusing cream that is over-ripe and rank in flavor, there is little hope of improving the quality of our creamery butter.

There is as great a weakness in the cold storage at our creameries as in the curing-rooms at the cheese factories, many of them cannot be called cold storages, as the temperature is reported from 50 to 60 degrees in some cases. We must have storages at the creameries that will keep the butter at 40 or 45 degrees even if it is only kept for two or three days.

Some of our butter-makers pay too little attention to finishing off the top of the packages, and when they are opened they present an untidy appearance. I believe it would be a good thing for our creamery business if the creamery men would only use one style of box for export butter, and have a distinct creamery brand on each box, so that there would be a distinct difference between a 56 pound box shipped from a creamery and a 56 pound box shipped from a store containing dairy butter.

Quite a number of creameries are using coolers for cooling the cream as it is delivered at the creamery, and they are giving the best of satisfaction. There is no apparatus in the creamery equipment that will give better results than a cooler and plenty of water to pump through it. A number of the creameries are using pasteurizers, and there is no doubt that they assist greatly in securing a uniform quality of butter, but to get the best results from pasteurizing the cream must test at least 25 per cent. fat.

Our butter-makers are adopting more uniform methods in churning and washing the butter, with the result that they are getting larger returns from the cream. Mottled butter seems to be the butter-maker's greatest difficulty in the making of the butter, and it is difficult to suggest a remedy. I believe greater care should be taken in washing the butter and in distributing the salt than many of our butter-makers exercise.

In conclusion, let me say that although it seems slow work getting the quality of our Western butter improved, there is progress being made. The

patrons are becoming better acquainted with the requirements necessary to produce good cream. Our makers are adopting better methods in the creameries, and our creameries are better equipped.

What we need to-day is a determination on the part of our creamery men to use every means available to make our Western Ontario butter second to none.

I thank the creamery instructors for their earnestness in carrying on the work among the creameries, and also the creamery men and buttermakers for their co-operation.

Group	Total creameries	Visited Regularly.	Number Visits.	Calls.	Sep.	C.G.	Both.
Western	28	23	120	7	3	19	6
Northern	20	16	91	7	.....	18	2
Eastern	26	14	69	1	2	21	3
	74	53	280	15	5	58	11

Group.	Oil Test.	Bab.	Comb.	Box.	Patrons Visited.	Expenditures.
Western	3	25	23	5	269	$ 8,985
Northern	9	11	15	5	545	11,035
Eastern	5	20	23	3	137	1,150
	17	56	61	13	951	$21,170

I have had very few complaints, and I think the work has been satisfactory. If it has not been, let us know, and we will try and make it satisfactory in the future. If you have anything to say do not be afraid to say it. It is only by close criticism that we will be able to do the best work for you. I am very sorry that we are losing some of our men. I find it difficult to get all round men. The relations between myself and the Board of Directors have always been of the very best. (Applause.)

Mr. McLeod: Mr. Barr said that less factories asked for instructors than formerly; are there less factories, or how is that?

Mr. Barr: No, we have two new factories in Western Ontario this year, and one factory changed from cheese to butter, which makes it just about the same number of factories. In Western Ontario we have 220; 10 less asked for instruction this year than a year ago. We did not have much complaint about the work, but some of them thought they would like to try a year without an instructor to see how they would get on, and they would save that much money. We have no objection to their doing that. We would like to have them in, but at the same time they are the conductors, and there were ten less visited this year than a year ago.

A Member: Do you think we should compel all factories to employ instructors whether they wish to or not.

Mr. Barr: It is the proposed change for next year. I understand Mr. Putnam will take that matter up, and as he is nearer headquarters than I am, it would be better to let him speak on that subject.

The Chairman: The next subject on the programme is Dairy Instruction for 1907, by Mr. G. A. Putnam, of the Department of Agriculture.

During the year a committee of the Eastern and Western Dairymen's Associations met Mr. Putnam, and the result of that is the report that Mr. Putnam will present to you to-day.

DAIRY INSTRUCTION FOR 1907.

By George A. Putnam, Director Dairy Schools, Toronto.

I have a most unenviable position this morning in the dual position which I occupy in reporting for the joint committee of the Associations, and in representing the Department of Agriculture for Ontario. I am asked to speak upon "Dairy Instruction for 1907." Dairy instruction is now associated with so many other questions that I must necessarily say something about these other features of the work, especially sanitary inspection of factories.

One would gather from listening to what is said from time to time by speakers, and by what we read in the papers, that we have not made very great progress in dairying in Ontario, but the records show unmistakeably that dairying has made sure and considerable progress during the past decade. The desire of the consumers of the Old Land for Canadian goods, the volume of business and the great increase in price, indicate a healthy growth. Still we must aim for something better, and the dairymen of Ontario will not stop short of something better. On occasions such as this we should give credit to the pioneers who worked faithfully, many of them at personal loss and without any expectation of ultimate remuneration, to establish this industry; and great credit is due, sir, to your sire, and those associated with him, and we are glad to-day to see you, in company with other dairymen, carrying on that good work. The men who are here deserve great credit for the business ability and the persistency which they have shown in carrying on this great dairy business.

I hear it sometimes said that it is difficult to get young men to take up the work of dairying. This is to be regretted, and I wish to say to the young men who are in this business, that I believe they will do well to stay with it. The agitation for some change in our methods of instruction and sanitary inspection and which we have before us for consideration at this time, is bound to result in good; and even though no radical change in legislation or methods is made at this session of the Legislature, we can accomplish much in the interests of the dairy industry by working more agressively along educational lines. We heard last night that the producers after all are of the greatest importance in this business; and it is quite true that the rest of us would be in a poor position if it were not for the large army of good producers which we have in Ontario. They are the essential persons in the industry. We hear a great deal about the lack of cleanliness on the part of the producer, and lack of care in cooling the milk. I think, sir, we can safely say that from 80 to 90 per cent. of the producers in this country are handling their milk in a satisfactory manner and deliver it to the factory in good condition.

I was pleased to hear Mr. Barr state this morning that there is a decided and gradual improvement in the milk supply. That improvement is bound to continue. The farmers of this country are awakening to the importance of taking good care of their milk, not only to better the quality of the cheese but that their returns may be the greater.

There are from 10 to 20 per cent. of the producers who need brushing up in their methods, and it is the duty of the farmers who are producing good milk to brush them up. It is also the duty of the instructors to do all they can to instruct the producer in improved methods, and the duty of the makers to do something more than they have done in the past in assisting farmers to take better care of their milk. I venture to say that if the com-

petent maker who is really interested in his work were to go among his patrons and advise and consult with them and show them clearly that he is anxious to do something to help them to produce a better quality of milk, his services would be appreciated and none would take objection to it.

There are about five per cent. of the producers in this Province who are surprisingly negligent in taking care of their milk. I believe if we brought this five per cent. of poor producers up to the average in the matter of cleanliness in handling their milk and in cooling it, our industry would be placed in a much better position. This is the great question of all lines of agricultural work; to get at the men who are away behind in the race. If we could only get the men who are not following up-to-date methods to improve and produce average milk, then we would increase the value of our dairy products to such an extent that their increased value would more than represent all the money which has been spent for education along dairy lines.

I believe the makers as a body are a competent lot of men. They must be a competent lot else we could not send out such a volume of first-class cheese as we did the past few years, and the price would not continue to increase if the makers were inferior workmen. We have our dairy schools, and I am glad to see that larger and larger numbers of dairymen are appreciating the necessity of taking, not only one full course, but going back from year to year and brushing up. We have some 60 students in attendance at Kingston, so many that Mr. Publow, the Chief Instructor, found it impossible to leave his work at this time.

The factories in Western Ontario are in pretty good condition, and that condition is being made stronger and better from year to year, and it is going to be still further strengthened during the next few years. We wish above everything else, to have sanitary factories. A sanitary factory does not necessarily require to be painted or decorated and have expensive decorations and nice gravel roads, good fences, etc. That is not absolutely essential, but where you find a really sanitary factory you usually find these other conditions. It is well for the instructor and the dairymen to look to the surroundings of the factories, because, if you can get a man to take a pride in his factory, you will usually get him to look after its sanitary condition. That old text of Prof. Dean's, in reference to the raw material, is still applicable, "Have clean and cool milk."

What is cleanliness in connection with dairying? You must first remember that the very conditions under which milk is secured are unfavorable. What other food product would we allow to stand in a cow stable subject to dust and odors? What housewife would want the hired man, who had been working all day on some uncleanly work about the farm, and most all work on the farm requires that the man's hands and clothes get dirty, to come into the kitchen and help her prepare the tea without first washing his hands and changing his outer clothes; and yet milk is more subject to contamination than most other classes of food. If you were to say to the average hired man, "Why do you not wash your hands and change your coat before milking?" he would reply, "I would have to wash after I am through; what is the use of washing now?" The very conditions under which the milk is produced, and the ease with which it is contaminated, require that exceptional care be exercised.

The question before us is how are we to get the desired conditions. The Department will certainly consider any representations or recommendations made by this Association. They recognize you as representative dairymen from the different sections, and you have come here at a

sacrifice to yourselves. You are deeply interested in the work, and any resolution you may pass in connection with this work will certainly be given due consideration. The Minister of Agriculture gave you almost unmistakably his views regarding this question last night. Still I can assure you he will be glad to receive your recommendations, no matter what they may be; and I would say, consider well your position, take it strongly, stand up boldly for your view of the case. Those who wish to criticize resolutions brought forward should do so here and not after the convention is over. Give voice to your convictions and opinions.

The work of the instructors, sanitary inspectors, and dairy schools has had a most beneficial effect upon the dairy industry; and we are proud of the advance which has been made; but we want to consider now how to make our efforts even more beneficial.

You will remember that it was decided last year that the instruction work and the sanitary inspection should be kept separate. Provision was not made for sanitary inspectors until after the season had begun, and we did not ask the instructors to give us the names of the poor factories with a view to send the sanitary inspector to them. We had given the public our word that the instruction and sanitary inspection would be kept separate for fear it would be detrimental to the work of the instructors. We did get a few tips from Mr. Barr and Mr. Publow as to what sections of the Province were most in need of inspection, according to their view; and we sent the sanitary inspector to those sections with instructions that they should call upon all factories in the locality visited, and show no favors whatever. I think this was a wise course to pursue for the first year.

With reference to the sanitary inspection work of next year, I shall be conservative in my statements as to what the Department will do during the coming season. We may rest assured that every factory in the Province, and we have a complete list of all these factories, will be visited for the purpose of giving each factory a sanitary inspection call; and we will likely make provision for not only one call, but it is quite certain that every factory, especially the poorer factories will receive two or three, and if they are very inferior, they will probably be called upon four or five times. We will be able to use the sanitary inspectors to much better advantage this year than in the past year.

We have on file all the reports made by the sanitary inspectors last year, and they will be a guide to us for the coming season. The inspectors, besides making recommendations as to the sanitary requirements, also in many cases made recommendations as to the improvements they thought would add to the appearance and efficiency of the factories. In our work during the coming year we shall consider the recommedations, which were made from a sanitary view-point; and it will be the work of the Department to see that these improvements, so far as they relate to sanitation, are carried out. If we look at the records of the work of the Department, we will not be able to point to any instance where either farmers, makers, or proprietors were unjustly dealt with. We do not want to do anything which would appear even to be unjust to any man; and I think we can all rest assured that, whatever action is taken by the Department or Association, no person will have any injustice done to him. It will be necessary to deal rather severely with some men if they do not do that which is recommended, and it will undoubtedly be in the interest of the whole trade. I think we are safe in making that broad statement. It is just possible, and I gather this from what the Minister said last night, that the sanitary inspectors and instructors will be kept separate. If this is decided upon, we

can rest assured that those taking instruction will not be discriminated against; in fact, I take the liberty of intimating that if there are any favors shown at all, it will be to the factories that take instruction. We shall make certain that the men who do take instruction shall receive their due share of the visits of the sanitary inspectors.

In talking with Mr. Barr and Mr. Publow and dairymen from many sections, from time to time, I gather that there is a feeling that some little change should be made in the method of instruction and sanitary inspection. With the view of getting the definite opinion of the Associations with regard to the matter, I went before the meeting of the Board of Directors at the time of the Toronto Exhibition last fall and placed before them a suggestion that a change in methods be recommended. This was fully discussed and with the result that they appointed committees who met at a later date, November 8th, in Toronto; and after discussing the question thoroughly, they decided to make recommendations such as you will find in the report which I shall have the pleasure of reading to you. Any recommendations made by that committee are agreed to by me so far as I represent the Associations, but the recommendation of that committee cannot be considered as a recommendation from the Department, although I am a member of the committee. You see my strange position, being a member of that committee and also a representative of the Department.

Whatever regulations are adopted, the greatest difficulty will be experienced in carrying them out in such a way that they will be of the greatest benefit to all concerned.

[Mr. Putnam then read the recommendations, which appear on page 88 of the Report of the Eastern Association.]

Just a word in conclusion. These annual conventions are occasions of great interest to the dairymen, and I am sorry we have not larger numbers here. However, those of you, who are here, are not only acting for yourselves, but you are acting for the large body of makers and producers throughout the country; and those who are not here will read with interest the recommendations that you may make and the action you take, and for that reason I wish to impress upon you the responsibility which rests on your shoulders. We should, at these annual conventions, raise up a standard to work towards. "We make our ideals, and then our ideals make us." If we have a high ideal before us we will have something to look up to, and a definite object in view. Our ideals today should be that every factory will be properly equipped, every maker efficient, every farmer a producer of first-class raw material. These are the ideal conditions which we have before us, and it remains with your association to recommend to the Department the methods which will result in these ideals being attained. We will work towards our ideals and we will win out in the end.

The CHAIRMAN: You have all heard the recommendations of this General Committee, and it is our purpose to have these approved of, or disapproved of at this convention to-day, but before we do that we want to have free discussion. It is a live question among factorymen. There is plenty of time to have the discussion, and there are prominent cheese factorymen and owners of factories and dairies in the western part of the Province present.

Mr. S. A. FREEMAN, Culloden: I am not a cheese-factory man or an owner of one, but, at the same time, I am a dairyman, and I am interested in a certain general way in the value of cheese, and I would like to see the standard kept up and the prices kept up. I do not send my milk to a cheese factory, but I send it to a factory where they require a better quality of

milk than a cheese factory. I rise to criticise the last speaker in a small way. He says that he finds so many patrons sending in poor milk, and then he goes on to tell how Prof. Dean says they should have clean milk and cool milk. If there is anything in this world the cheese factories want it is clean milk and cool milk. I have found it is not a very great task to cool milk, and I know the difference between milk that is cooled and milk that is not cooled. I can cool it for one cent a hundred. I have a cement tank set down in the ground, and a good drain from it. We wash our cans in this tank, and then clean it out, and we set our milk in there. I have a windmill and a cement supply tank that will hold abundance of water. I set the milk in this tank in the evening when we are through milking, and I go in and get my supper, and then come out and give it a stir up, and pull out the plug and let the water out and let fresh water in and the milk is cooled down to 70 degrees.

A MEMBER: How cool did you say you got it?

A.—Seventy degrees.

A MEMBER: That is not cool enough.

A.—It is a great sight better than yours that sits in the can, and is not cooled at all. (Applause.)

The MEMBER: I cool mine and take the thermometer, and see that it is down to 65 or less, and mine goes to the cheese factory. (Applause.)

Mr. FREEMAN: Then you are a good man, and I would like to shake hands with you. I ventur to say they are not after you.

Q.—Do you cool your morning's milk to 65?

The MEMBER: No, I do not.

Mr. FREEMAN: Then I am ahead of you, because I cool mine in the morning.

The MEMBER: When you say that you get your milk down to 70, you do not know as much about cooling milk as you ought to.

Mr. FREEMAN: That extra five degrees lower is not of a great deal of importance. I think my night milk is cooled to 65, and we cool our morning's milk to 70 degrees. I do not think you would have so much trouble about sanitary inspectors if you would encourage the farmers along this line.

Mr. PUTNAM: I would not like any man to go away from this convention with the impression that I do not fully realize the importance of adopting clean methods and keeping the milk cool. We got from different sources the very best information regarding the cooling of milk, the care of utensils, the care of stables, etc. The Department had that information compiled, and 15,000 copies were printed and distributed through the instructors and inspectors, and mailed to every factoryman in the Province. I am almost ashamed to say anything about this question after having harped so much upon it. I have stated to Mr. Barr and Mr. Publow upon different occasions, that if we devoted all our attention for one or two seasons to the improvement of the raw material, the other difficulties which we hear about would practically all disappear. I am still of that opinion. (Applause.)

Mr. R. GLEASON: I heard here to-day that the man behind the cow is the important man in the situation. What I understand by e resolution before the meeting is that they want to take another step in advance, and I believe that step will not be as good or as conducive of profit to the farmer at large as the system that has been acted upon this last year. In short, I think they seek protection for the factoryman and the cheese-maker. They want us to give them a set price for the manufacture

of cheese. They say we must give them an advance so that they will make a good living for themselves; that it will not be very hard for the patrons to give a little more; and they also want to protect his bounds, so that another man cannot come in and manufacture at a cheaper rate and take away this man's living. I believe that would be all right if it could be worked out after a favorable plan, but I say we should protect the farmers, too. Let us say that, in every locality where these small factories are that are only making a small amount of cheese, every man that has 100 acres of land shall keep 20 cows, and must send in 100,000 pounds of milk, and he must give $1.25 a hundred for manufacturing, then these small factories would be doing a rushing business, and a great many more could be planted in between. If you are going to protect the cheese-maker, protect the man on the other end, and make his neighbor do the same work that he does. Can you do it? If you can I think it would be complete. (Applause.) If you cannot do that then you have all the protection you need. If a man puts up a cheese factory and cannot draw trade to him he must go out of business and let somebody else take hold of it, or let a man that is further reaching than is come in and take his place. I do not see any better way. I do not think we can support a resolution that protects the cheese-maker, and says a man must take his milk to that market whether he wants to or not. We want to take our products to the best market where we get the best price, and to the man that gives us the most taffy, for we like taffy as well as anybody else.

Mr. J. N. Paget: I was very much impressed with some of the statements the last speaker made. No doubt if the conditions he has mentioned could be obtained the system would be ideal; but, I think, when he looks at the recommendation that was made by the committee, and that are now before the convention for discussion, he will look at them in a different way. I think he is looking at them somewhat partially. I think he is looking at them altogether from the standpoint of a producer, and I think he has arrived at a wrong conclusion. I do not think the cheese-maker or the owners of the factories are the men primarily to be protected under this recommendation. It is a fact that cannot be gainsaid or contradicted, that the conditions described exist to-day throughout this Province—perhaps applying to a greater extent in Eastern Ontario than the West—but, nevertheless, it is here, I think. As Mr. Putnam has said, there is a very large percentage of patrons that are doing well, and that are sending a very large quantity of milk; but there is a percentage, and in some sections a greater percentage than in others, who are not doing anything at all towards improving the quality of the milk. They are absolutely indifferent. Now, who is being affected to the greatest extent by the action of this indifferent, negligent, careless man? Is it the cheese-maker or the owner of the factory? I contend it is no such thing; it is the farmer, his neighbor who is taking good milk to the factory. (Applause.) The statement has been made, and it remains uncontradicted, that when we get in a vat of six or seven thousand pounds, two or three cans of over-ripe and tainted milk, that is going to affect not only the quality of that whole vat of milk, but it is going to affect the quantity of cheese that you get from that milk, to the extent that from six to seven thousand pounds of milk it will make a difference of from thirty-five to forty-five pounds of cheese. (Applause.) If that is a fact, who is losing by this careless man who sends a couple of hundred pounds of tainted or over-ripe milk; is it the cheese-maker? (Cries of "No.") Is it not the farmer who has been taking good care of his milk and allows this condition to exist? We ask in these recommenda-

tions that this condition be removed. Who is going to be protected by the removal of that condition? This gentleman says we are asking protection for the cheese-maker.

Mr. GLEASON: Not in that line?

Mr. PAGET: Those of you who know me know that I have never taken a stand behind any class. I have been endeavouring to devote my thought for the betterment of the condition generally throughout the jurisdiction of the Dairymen's Association of Western Ontario, and I believe that, if the recommendations that are now before this meeting for discussion could be brought into force and carried out, the dairy farmers of our country would be the most protected men in connection with the whole business.

There is another side to the question. I have had some information within recent weeks as to the condition in Eastern Ontario, and the same condition exists to a certain extent in Western Ontario. Some farmers are sending milk to the factory, and the cheese-maker knows it would be impossible for him to make the finest goods out of that milk; but, if he would send that milk home, the result would be, in some instances, that the farmer would take his milk to the neighboring factory, and that factory would only be too willing to receive it, and the other fellow is depending upon that patron to some extent. Therefore, he takes that milk in and says nothing about it, and the result is the whole vat of milk is injured, and the quality is injured and the quantity lessened, and I contend that the whole industry of agriculture right from the foundation up to the pinnacle is injured. (Applause.) There is only a small percentage of these men in the country, but they are here and I am heartily in sympathy with that resolution. I am not prepared to take back one act that has been thus far carried before the Department. I believe it is one of the best moves that has ever been asked for with regard to this work. I believe we must protect, and if necessary, have legislation whereby the men that are injured can be protected. If a man put his hand in your pocket and took out a dollar, the law would at once punish him, and I think we should have a law that would protect you against the man who takes a great many dollars out of your pocket by sending tainted milk to the factory.

Great Britain is our market and must continue to be, and our cheese is known as Canadian cheese regardless of what particular locality it comes from, and if inferior cheese go over there, it is rated as Canadian cheese. Some of the best chee e that ever reached the Old Country came from Canada this last year. On the other hand, some was so inferior that it has been said that they have seen poorer cheese from Canada in 1906 than they have seen in the past ten years. I hope there will be free discussion here to-day. I contend what is being asked for by the Dairymen's Association will be sustained by every dairyman that has the best interests of the dairymen at heart. (Applause.)

Mr. GLEASON: I am in perfect sympathy with the system of inspection, but I think you stated an extreme case. I do not think we have any record in our neighborhood of any such change of patrons in the middle of the season, but I do not see why the patron should not have the privilege of going to the other factory if he wants to, if he starts in at the beginning of the season. The maker of the other factory might be a little related to him.

Mr. FREELAND: I wonder if some of this poor cheese that we have been hearing about has not been caused by shipping it too green.

A MEMBER: I was out in Vancouver last summer, and I noticed that the Chinese had control of the distributing of vegetables, and I asked how that was. They said a white man and a Chinaman started up in business, and the white man stayed long enough in the business to put the Chinaman out. But he is no sooner gone than another Chinaman comes in, and the white man stays long enough to put that man out; but the next Chinaman finally puts the white man out. And it is the same in the cheese business. Year by year we add machinery and new factories start up within a short distance of us. That man comes in very often inexperienced, but he comes in and tells you, "I can pay more than the other fellow," and the farmers all go to him. Enough will go to spoil a route, and finally that man goes down, and then another comes in and takes his place. I have stayed against opposition now for probably ten years, and every one of these men have gone down; but I have not made any money, and I am only one of the great number. There are others in the same way, and I would like to see something done to prevent a small factory starting up against another factory. That system has brought down the name of our product in the Old Country. I think the larger the factory the better.

Mr. W. ROLLINGS: With regard to the patrons changing in the middle of the season that is not an extreme case. I have suffered materially from that effect. I have been in the business for twenty-five years and I have struggled to make my business a success, and I am poverty stricken to-day. (Applause.)

A resolution that the recommendation be adopted was moved by Mr. J. FLEMING, seconded by Mr. W. H. KARN.

A MEMBER: I would like to know how the $12 is going to be collected from every factory in the Province?

Mr. PUTNAM: I think that is answered by saying we would collect it. It would be collected just the same as a license fee. You will have to pay it if the regulation is adopted.

A MEMBER: Is it a matter of adopting the recommendation or is it a matter of legislation?

Mr. PUTNAM: It is a matter of legislation. This is just a recommendation to the Department. If the Department passed a regulation whereby each factory would be taxed $12 then they would provide machinery for collecting the money.

A MEMBER: Does that mean that every factory would be compelled to engage an instructor?

Mr. PUTNAM: No; but every factory would have the privilege of calling for an instructor.

Mr. SMITH, Waterford: I believe the system is all right. I believe every factory should do its own testing. The cheese-makers have been instructed, and they are pretty well qualified to make cheese, and I think now the instructors should get after the other fellows that send the milk in in an improper way. I think the instructors should devote their time to testing the milk, and looking after the men who send milk not fit for cheese-making.

Mr. BARR: I think the instructors throughout the Province know something about the conditions at the factory, and the conditions on the farm. I believe our methods of making cheese are as good as they are in any place in the world. The statement was made last night that we are still a long way behind English cheese made on the same system. I do not think we want to make cheese on the same system as they make it in the Old Country, where they are all made on the private farms. I believe we have in our

factory system as good a method of making cheese as they have any place in the world. Our makers have adopted everything that has been recommended, and they have adopted some things they have lost money on, because they were willing to try them. I believe our cheese and butter makers have adopted every new method that has been recommended. The acidimeter came in, and I believe there are only a few factories in Western Ontario where you will not find the acidimeter. Certainly when the wire curd knife was recommended they soon had them in three-fourths of the factories.

Our methods of instruction have been running on the same way for four years, our methods of making are the same, and I tell you frankly I have nothing new to recommend next year for making cheese. Where are we going to get any change in our method of making cheese? Our best makers can make cheese as good as any instructors in this country and can make them along the same lines as any instructor would recommend. We must turn our attention to securing a better raw material. That is the point; but how are we going to get it?

In some of the factories the maker will not allow you to go out to the farmer, because, if the instructor goes out and if the neighboring factory does not employ an instructor, the patron is apt to get offended and go to the other factory the next year. The cheese-makers must stand shoulder to shoulder in the rejection of bad milk, or you will have to accept some help from the Department. I think that, if the instructors had more authority to deal with these men regardless of the maker at the factory, that there would be a marked improvement in the quality of the milk. Or if every one of the factorymen would agree not to accept milk from any patron whose milk has been rejected at another factory you could fix the whole situation in two days. Will you do it? I do not believe you will.

A MEMBER: The people in our county have agreed to do it and we do it.

A MEMBER: How can you educate a Canadian—by coaxing him, or driving him?

Mr. BARR: I do not believe you can drive him unless he is a poor character. We have been doing our best to educate our patrons during the last five years, and I want to say we have made splendid progress. Yet we were told last summer by a farmer that, if the maker did not like his milk the way it was going to the factory, he could do the other thing, and he would send his milk to another factory, and his milk was causing a loss of 20 or 30 lbs. of cheese a day. Just so long as our makers take in that kind of milk just so long will they get it. You will either have to stand shoulder to shoulder in rejecting bad milk, and in arranging routes or territory or give the instructors authority to deal with the patrons who refuse to make improvements.

I think we should give the instructors a little more authority and let them go to the farmers and make them do better. If a man is sending milk that causes a loss of $5 or $10 to a factory, why should we allow him to do that kind of thing.

When you coax that man or try and persuade him to do better and he says, "Get out, I will do as I like." Then I say we should take that man in some other way, and we should be able to say to him, "You will fix that milk, or you cannot send it to any factory in this country." (Applause.)

I do not care so much about the sanitary conditions at the factories, but, unless we get some more authority or more privilege in connection

with dealing with a few of these men who are causing all this loss in the cheese and butter in this country, and deal with them in a different way, I claim we can scarcely do anything more in the way of education. We can keep at it, but we have enough men left who will not go to any meeting, and who will still continue to send milk to the factories to spoil the make of cheese.

At one district meeting the maker said he took particular notice of the quality of cheese he made one cool week. The next week was hot, and the week after he sent back all gassy milk, but the patrons were not cooling down the milk to 65 or 70 degrees, and during these two hot weeks his patrons lost $8 or $9 in hard cash every day compared with the week before, with the same amount of milk sent in.

I think we should take some action with regard to this matter. If you will agree to do it yourselves I will hold up both hands for it, and say you are the best lot of men in Canada; but, unless you will do it, I think the next best thing is to give our instructors who are in close touch with the work a little more authority to deal with these men, and get them to do better work. It will not affect our best men one particle. The careless man has been getting the long end of it for thirty years, and I think it is time that the good man got the long end of the business.

Mr. Boyce: Mr. Barr made some reference to sanitary inspection. He said on the platform to-day that he cared nothing about sanitary conditions at the factory. I do not quite agree with that. I believe they should be right. We know there is more tampering and adulterating of the milk at the present time than there has been in past years, and the step that is now being taken is still to get away from the testing of milk at these factories. I claim that unless the cheese-maker calls on the instructor to do the testing he will never be able to do it. There will be very few cases reported, from the fact that the maker might just as well discard that patron in the first place, because he would leave him at any rate.

As soon as the instructor becomes a sanitary inspector he will lose his influence as an instructor. I do not quite agree with Mr. Barr that we have come to our limit, because I believe there is a good deal of work to be done along these lines. If we are going to make the instructors sanitary inspectors we might just as well cut the instruction off, and call them sanitary inspectors.

Mr. Barr: I do care a very great deal for the sanitary condition of factory, because I do not want to work in a dirty factory. The sanitary conditions of the cheese factories are not all right, but I believe the material that is being delivered to our factories is causing a tremendous amount more loss than the sanitary condition of our factories, and that is why I placed the emphasis on the raw material. Has the Ontario Government got any right to pay out a lot of money to make your business honest?

A Member: Whose business is it if we take in over-ripe milk?

Mr. Barr: That is your business.

A Member: I understand we can be fined if we do that?

Mr. Barr: Under the new regulations you would be. Will you tell me how much injury has been done to this trade of cheese and butter-making by putting a little water in the milk or taking off a little cream? And yet you will find the farmers of this country will pay ten times more attention to a man who takes a little cream off, or puts in a little water, than they will to the man who is sending in tainted milk. The Government should put in motion something that would enable you to deal with these

men. One test of the milk will convict any man if it is wrong; but one test is a dangerous thing to prosecute on. I will not prosecute a man on one test, and you wouldn't either, if you were in my place. What are you going to do with it? Is the instructor going to stay in the factory three days and get three tests? Is it not much easier, if you have any suspicion, that you should do some of that testing yourself, and find out if the man is tampering with the milk, and then you know when the instructor comes along that, if he finds that milk is wrong, he is not doing him an injustice if he is prosecuted. If this thing goes through, we should not have any $10 fines, we should have it $50 or six months hard labor. (Applause.) We will test the milk when a factoryman asks us to do it, and when we know we are not doing a man an injustice we will prosecute him.

Mr. WAGG: Does that tax of $12 apply to creameries as well as factories?

The CHAIRMAN: Yes.

Mr. WAGG: I have a butter factory in the northern part of the Province, and to have an instructor visit there would require a week's time, and the expenses would have to be paid by someone, and I am sure that I would not care to pay them, though I am not sure that the Department would care to pay it, and I would not feel like paying a $12 tax each year for this instruction. I believe if the sanitary inspector rigidly enforces his authority that these factories that require instruction will soon get it.

Mr. PUTNAM: Mr. Wagg would be dealt with especially, because he is in the northern part of Ontario and is in a special position.

Mr. WAGG: I am heartily in sympathy with these recommendations. I know the factories have been greatly benefited by these instructors' visits.

A MEMBER: This discussion has surely been very interesting and I feel in sympathy with the recommendations asked for. The trouble is always with the poor man. Everyone who has had anything to say has spoken about the poor man that has not nice buildings. I think there should be one more clause added to that recommendation, and that in the case of those who are striving hard and keeping cows, and want to have things as nice as possible, the Government should provide money to help the poor man to pick up. (Laughter and applause.)

Mr. BOYCE: We believe the farmer is going to receive the most direct benefit and would not it be the proper way for the farmer to pay this?

Mr. PUTNAM: Speaking as a member of that committee I believe that, if this regulation were adopted, in a year's time you would see such an improvement in the factories and creameries in the country, and in the methods of handling the milk, that you would not need half the inspectors or instructors, and that in three years' time we could cut the number in half, and, if this regulation were adopted, I believe the fee would be lessened rather than increased, because the fee of $12 would cover all the expenditure that would be found necessary.

Mr. CORNELL: I am glad there are some farmers here. These Conventions are not filled up with the patrons the way I would like to see them. I am a patron and a cheese-factory owner, too, and I have noticed when the farmer gets up to speak he feels as though he were a little out of place. What are all these gatherings for? We are spending our money and what is it for? Who is going to get the benefit? The whole drift is to better the dairymen's condition.

The motion to adopt the recommendations was then put to the meeting and carried.

DAIRY COMPETITION PRIZE LIST.

	Total Score.
September White Cheese.	
1st, J. E. Stedelbauer, Fordwich	95.82
2nd, W. S. Stocks, Britton	94.82
3rd, Jno. Cuthbertson, Sebringville	94.81
4th, W. Hamilton, Listowel	94.49
September Colored Cheese.	
1st, W. Hamilton, Listowel	94.82
2nd, R. A. Thompson, Atwood	93.99
3rd, Geo. Cameron, Lyndoch	93.81
4th, Arthur Anderson, Scottsville	93.49
October White Cheese.	
1st, J. E. Stedelbauer, Fordwich	96.66
2nd, G. M. McKenzie, Ingersoll	95.66
Tie 3rd, Donald Menzies, Molesworth	95.15
Tie 3rd, Mary Morrison, Newry	95.15
October Colored Cheese.	
1st, B. A. Holland, Clear Creek	95.49
Tie 2nd, Jas. Ross, Cotswold	94.32
Tie 2nd, G. M. McKenzie, Ingersoll	94.32
4th, G. R. Stone, Curries Crossing	94.31
56 Pound Box Creamery Butter.	
1st, W. A. Bothwell, Hickson	96.82
2nd, R. A. Thompson, Atwood	95.49
3rd, E. M. Johnston, Innerkip	94.14
4th, G. M. McKenzie, Ingersoll	93.99
20 One Pound Prints, Creamery Butter.	
1st, W. A. Bothwell, Hickson	96.15
2nd, W. K. McLeod, Vanneck	94.49
3rd, G. M. McKenzie, Ingersoll	94.32
4th, Jno. Cuthbertson, Sebringville	93.99

Cheese Buyers' Trophy—For best Cheese on Exhibition.
J. E. Stedelbauer, Fordwich.

Special Prizes.

One Case of Hansen's Rennet Extract, By The Ballantyne Dairy Supply Co., to the Cheesemaker scoring the highest number of points on September White Cheese, J. E. Stedelbauer, Fordwich.

One Case of Hansen's Cheese Color, By C. H. Slawson & Co., to the Cheese maker scoring the highest number of points on September Colored Cheese, W. Hamilton, Listowel.

One Case of Hansen's Rennet Extract, By C. H. Slawson & Co., to the Cheesemaker securing the highest number of points on October White Cheese, J. E. Stedelbauer, Fordwich.

One Case of Hansen's Cheese Color, By The Ballantyne Dairy Supply Co., to the Cheesemaker scoring the highest number of points on October Colored Cheese, B. A. Holland, Clear Creek.

$5 in cash, By The J. B. Ford Co., to the Cheesemaker who is a regular user of Wyandotte Dairymen's Cleaner and Cleanser having the best finished cheese on exhibition, G. M. McKenzie, Ingersoll.

$5 in cash, By The J. B. Ford Co., to the Buttermaker who is a regular user of Wyandotte Dairymen's Cleaner and Cleanser having the neatest and most attractive exhibit of butter, G. M. McKenzie, Ingersoll.

The choice of a handsome gold medal, a lady's or gentleman's gold watch, and $5 in cash, total value $20, to the Buttermaker securing the highest score on butter in Class 3, colored with Alderney Butter Color, W. A. Bothwell, Hickson.

$5 in cash to the Buttermaker securing the second highest score on butter in Class 3, colored with Alderney Butter Color, R. A. Thompson, Atwood.

Mr. Barr: Mr. Stedelbauer, the man who wins the trophy to-day, is one of our youngest cheese-makers, and he was one of the cleanest men I saw last summer. (Applause.) I stepped into his factory one morning last October, and I found everything in apple-pie order. He has not got the best equipment, and that shows it is not altogether the equipment that is

necessary, but this good, clean, steady work. (Applause.) He is a steady man, and a clean man, and I hope you will all see him. I am glad to see our young men coming to the front. The older men, of course, can afford to give them these prizes.

REPORT ON EXPERIMENTAL BUTTER MADE AT GLENCOE CREAMERY DURING SUMMER OF 1906.

It was considered advisable by the directors of the Association to conduct some experiments on different methods of handling cream and churning it under actual creamery conditions.

Mr. L. Smith, of Glencoe Creamery, very kindly offered us the use of his creamery for this work, and Mr. C. W. McDougall, the Creamery Instructor of the Eastern Creamery group, was placed in charge of the work, the other creamery instructors, Messrs. Dean and Hart, also spent a few days each on the work.

The object of the work was to ascertain, if possible, the keeping qualities of butter made from gathered cream handled in different ways.

The experiments made were comparing cream cooled immediately upon arrival at the creamery by running it over a Lister Cooler with the same cream pasteurized, and cream treated in the same manner and adding culture to the raw cream; pasteurized cream with or without culture; unpasteurized cream with or without culture; churning high and low testing cream; washing the butter with rolls in motion, compared with washing in ordinary way; treating cream in rather a careless manner in cooling, compared with cooling immediately upon arrival at creamery.

As it would make too lengthy a report to give the total scores on each lot we will only give the flavor of each lot. The first score in each case is the average of three scorings by Messrs. Waddell and Steinhoff in the months of August and September; the other score is the average of the judges' score at the Dairy Exhibition in London on January 16th.

The score of Messrs. Waddell and Steinhoff will be designated by W. & S., and the other score by D. E. The difference between these two scores should give a very good idea of the keeping quality of the different butters.

		W. & S.	D. E.	Difference
No. 1	Cream cooled by running over cooler	40.12	34.66	5.46
	Same cream pasteurized	41.62	35.	6.62
No. 2	Cream cooled by running over cooler, 13% culture added	38.87	34.75	4.12
	Same cream pasteurized, no culture added	40.5	36.66	3.84
No. 3	Pasteurized cream, no culture added	42.25	36.	6.25
	Same cream, 12% culture added	41.5	35.16	6.34
No. 4	Unpasteurized cream, 12% culture added	40.3	36.33	3.97
	Same cream, no culture added	41.3	37.16	4.14
No. 5	Unpasteurized cream, 15% culture added	41.33	36.66	4.67
	Same cream, no culture added	41.33	35.33	6.00
No. 6	Unpasteurized cream, 7% culture added	39.5	33.99	5.51
	Same cream pasteurized, 7% culture added	41.16	35.99	5.17
No. 7	Butter washed with rolls, overrun 21.9%	41.33	35.33	6.00
	Butter washed ordinary way, overrun 16.3%	41.83	36.16	5.67
No. 8	Butter washed with rolls, overrun 17.5%	42.16	38.5	3.66
	Butter washed ordinary way, overrun 16.9%	42.5	37.	5.50
No. 9	Butter washed with rolls, overrun 20%	42.5	35.66	6.84
	Butter washed ordinary way, overrun 14.1%	42.66	35.	7.66
No. 10	Cream thoroughly cooled Saturday evening and kept cool until Monday morning	40.16	34.16	6.00
	Same cream treated carelessly	37.66	34.66	3.00

In the experiment comparing cooling thoroughly without pasteurizing, with pasteurizing, the cooling gave slightly the better keeping butter.

No advantage in adding culture to pasteurized cream.

There is an advantage in adding culture to raw cream.

Washing the butter with rolls in motion gave a poorer quality in one case, and a better keeping butter in two cases, and in all cases gave a larger amount of butter.

The culture which was used was made from pasteurized cream. It was made in the first place from a skim milk culture, and then carried on from day to day in cream; the object was to see if a cream culture which could be made in a cream gathering creamery would improve the keeping quality of the butter.

GEO H. BARR.

MOISTURE IN BUTTER.

BY PROF. R. HARCOURT, O.A.C., GUELPH.

This question of moisture in butter is one on which there has been a great deal of study, in which there is a great deal of diversity of opinion as to how the water or moisture may be increased or decreased by the butter-maker. I am not going to pretend to touch that side of the question at all this afternoon. I want to deal simply with results of some work that have been done on butter that was sent into us for analysis. The butter-makers will remember last spring we sent out a circular letter to all the butter factories we could get the addresses of, asking the maker to send us butter if he wished to have the moisture in it determined. We understood that a great many of the makers were anxious to try some of the methods that had been out-lined at various times for the increasing of moisture in butter. Therefore, we wrote to say if they would send to us samples of butter, and give us full details as to the nature of the cream and the method by which it was manipulated, we would determine the amount of moisture and let them know the result. We received from the butter-makers 262 samples of butter, and in all of these the moisture was determined, and in addition, in some of them the curd and salt. I cannot give you the details of all the results. I cannot give you the percentage of moisture we got under the different methods of manipulation. That part of the data is not all in my hands as yet, some of it is in the hands of the Chief Inspector. We hope, however, to get this data, and if valuable enough to put out in bulletin form we will do so. All I have to say at present of the 262 samples which were analyzed, the average percentage of moisture was 14.1. There was a range of moisture from 10.34 to 19.92. Now, of course that does not mean that the lower percentage was one that came in butter in which the man was trying to incorporate moisture, because he divided the butter he had and churned and then handled it in two different ways and then sent us two samples. So that the one would represent his ordinary way of handling the cream, and the other the way in which he was trying to incorporate the moisture, so that we have a range of 10 to 20 per cent. in the amount of moisture that was incorporated in this butter. There were only 18 samples out of 262 which overrun the 16 per cent., the legal amount allowed. With reference to the curd in these samples we found it varied from about .4 to .85 per cent.,

very much lower than is ordinarily given in butter. These were the determinations we got with careful work, and after proving our methods of work. The lowest salt that we found was 6 per cent., and it ranged from .6 to a little over .4 per cent.

I may say we found, in looking over the results, no relation whatever between the percentage of moisture and the percentage of curd, or between the percentage of moisture and percentage of salt. We analysed the butter sent in under the competition, and we made a determination of moisture, salt, and curd in all the 113 samples which came down to Guelph. No one of these samples reached 16 per cent.; 15.8 was the highest percentage in any of these 113, the lowest was 9.4—not so wide a range as in the other butter. The amount of curd was from .1 up to .85 per cent., the highest was about the same as was in the other butter; the amount of the salt varied from .6 up to 5.98 per cent.—practically 6 per cent. of salt. In the case of these samples we find no relation in any way between the percentage of moisture and the percentage of curd or of salt, and so far as we have been able to state it we find no relation between the percentage of moisture, and the score that was given by the judges upon that butter. It is true that the butter that has the highest percentage of moisture 15.82 per cent.) had been within .3 of the highest score, but on the other hand, we find the other samples do not correspond with it. Possibly there is a little tendency in the result to show that the butter with the higher percentage of moisture got the lower score on the third scoring, which I think was the end of three months from the time it was made. That is the result of 305 samples of butter which we analysed. I have nothing more to say with reference to these results. We hope to study out these results more in detail along with the data. Nobody seems to have had time enough to go into the details.

With reference to the determination of moisture, there are many ways in which we can determine the moisture in butter. The old standard method is by taking a certain small amount—about two grams of butter —and heating that in oven from four to six hours, or until it is constant in weight, and then determine the loss of weight, and you will have the moisture. I believe that method is accurate, but the trouble that it is slow, and nobody wanting results quickly cannot afford to wait five or six hours. It is not that it seems a large amount of time in the actual operattion, but the time in which it takes to dry. Another method is by taking the same amount of butter and heating it directly over a flame, and we can get results largely duplicated within one-tenth per cent. within five minutes, but it demands a fine scale for weighing, which is not always in the hands of the ordinary butter-maker. An improvement has been brought about in that method by Prof. Patrick, of the Department of Agriculture and Bureau of Chemistry of Washington, and that is simply taking a larger quantity of butter, and using a larger dish to heat it in. That is all the difference. Instead of using two grams of butter use 20 grams of butter, and good results have been got by using as high as 50 grams of butter. The advantage of using a larger quantity of butter is simply that you can use less accurate scales. We have followed out a number of experiments, and have got results that will correspond within one-tenth per cent. That is, taking 20 grams of butter put it into a large dish and heat it directly over a flame, boiling out the water: and just the same result has been obtained if we take a small amount of butter and put it into an oven and leave it there for five or six hours. There is another method that Prof. Gray, of Iowa, has advised, of which I know nothing

except what I have seen in *The Canadian Dairyman*. That method may be a great deal better than the one I have spoken of, but I do not say that it is.

I think perhaps it would be interesting if I simply make a determination of moisture in the butter according to the method I have explained of heating directly over the flame. We have been able to do that and get results inside of ten to twelve minutes. I have with me tiny scales such as we find convenient for certain lines of work in our laboratory. The advantage of this scale is that there are three beams, and you have no trouble in getting the exact weight. In this case I have got to use a glass beaker. In ordinary work we use an aluminium beaker, which is far lighter and which will stand the heat without any trouble, and it cannot be broken as readily as the glass dish. I have an alcohol lamp which I will use, but any kind of flame will do equally as well. While you are heating the butter it should be thrown up on the side of the dish so as to leave a big surface. As soon as the sizzling noise that comes with the moisture leaves and ceases, you can stop heating. [Prof. Harcourt here gave a very interesting demonstration of how to determine the moisture in butter.]

The amount of moisture in the sample I have just tested is 11.25 per cent. of moisture. That is all I have to say on the question of moisture in butter this afternoon.

I would not attempt to deal with the question of how you might incorporate the moisture. I am dealing with results of work that you have done among yourselves and we hope to get these results put into some shape so that they may be of greater use to you. With regard to this method I do not for a moment claim it is our own, and I do not claim it is a better method than Mr. Gray's. I would like to try it in conjunction with this method, and see what the result would be. (Applause.)

The CHAIRMAN: This is an ordinary sample of butter. I went around the corner and got it at the first grocery store.

RESULTS OF EXPERIMENTAL SHIPMENTS OF BUTTER TO LONDON, ENGLAND.

By PROF. H. H. DEAN, O. A. C., GUELPH.

My topic this afternoon is one which will enable me to give an account of some experimental shipments of butter to London, England, which we made during the past year. But before I take this up will you allow me to say a word about the work we do in the dairy department at the College. So far as I know I have never brought our work directly before the Western Dairymen's Association.

Our work in the dairy department is of a three-fold nature. First and foremost, teaching the science and practice of dairying to the students who come to us. About 150 students of the regular course take lectures and practical work on dairying through the college year. Then in our various short courses we have about 100 students who take more or less dairy work, so that we have in round numbers about 250 students every year who take lectures and practical work in the dairy department. Of course I cannot do all that work alone. I have three assistants during the year, and five or six special instructors for three months of the year.

Second, we carry on experimental work, trying to solve some of the problems that come up in connection with the dairy business. During the year 1906, we conducted 103 experiments relating to butter-making, 85 experiments relating to cheese-making, 58 experiments relating to testing of milk and cream, and 250 samples of cream and milk were sent in to us to be tested. Quite a number of cheese factory and creamery men sent samples to us to have them tested. One creamery man wrote to us that he found it a very good way to settle disputes between himself and his patrons, and that when the test was made by us the farmer or the patron seemed satisfied. I think it is a great tribute to the Agricultural College that farmers are willing, in most cases, to accept tests which we made when there was a dispute between them and the butter-maker.

About one hundred official tests were taken charge of by us for the Holstein Association. About 85 tests in duplicate were made relating to moisture in butter and cheese, work something along the line of that Prof. Harcourt has pointed out to you to-day. In all, we have conducted about 680 experiments relating to dairy work, not to mention the large amount of work which we did in connection with the milking machine, a report of which I gave at the Winter Fair.

In addition to carrying on experimental work and teaching, we carry on what may be called a dairy business. We have a creamery and cheese factory business which is in direct charge of the dairy department. For three months of the year we have a dairy school, and in that time we manufactured into butter and cheese 320,000 pounds of milk and cream that was bought from the farmers about Guelph, and cost us in round numbers $3,800. We sold the product for $4,350, or nearly $500 more than what the raw material cost us. We have the regular college students for about six months, and the remainder of the time we are carrying on experimental work. We manufactured into cheese and butter about 896,000 pounds of milk and cream. During the whole year we manufactured in round numbers 1 1/3 million pounds of milk and cream into cheese and butter. The total revenue during the year 1906 was about $17,500, of which nearly $15,000 was cash. In the year 1891, when I took charge of the dairy department at the College, the revenue from the Dairy Department was about $1,000. I mention these figures to show you how the business side of the dairy department has grown during the past sixteen years. The raw material cost us in round numbers $8,000, the products of cheese, butter, milk and cream sold for $10,600. We received for manufactured goods, after making all allowances for loss which occurred in carrying on experimental work, $2,600 more for the manufactured goods in the nine months than we paid for the raw material. Our total net expenditure in the dairy department was $2,600. We supplied to the College dairy products to the value of about $1,300. We purchased during the past year $850 worth of live stock. We assumed that it cost us to put in and operate the milking machine $500, so that if we allow for the milk and cream that was furnished to the College and not paid for in cash, and if we deduct the cost for live stock, which under ordinary circumstances would be charged to capital expenditure, and if we allowed for the milking machine and the experiments conducted therewith, the total cost of experiments in the Dairy department for the past year have been entirely paid for by the butter, cheese, milk and cream which has been sold from the Dairy department.

Why do I mention these things? You will remember that one year ago a gentleman on the platform criticised the Dairy department very strongly and practically said that the men at the College might be all right as

teachers and professors, but they were no good to carry on a business. Now, I hold that these figures make a fair showing for a college professor, and you will pardon me for referring to them. (Applause.)

During the sixteen years in which we have had charge of the Dairy department, the revenue has been about $130,000, and we have lost in bad debts in round numbers $600, and I ask if there is any business man in this meeting that can show a business of over $130,000 and only have about $600 of bad debts in that time—or less than ½ of 1 per cent.?

We are of course open to fair criticism, and I think it is right that public men should be criticised in a fair manner. We do not expect that we shall have any great monument raised to us, but personally I hope to live in the hearts of the students who have been at the College, and the men whom it has been my pleasure and my great delight to meet with in the dairy business. The man who does his duty in connection with this work must of course expect a great deal of criticism.

Aristotle says, "Man is a hunter after the truth," and every man who occupies a position of this kind should be a seeker after the truth. A professor may very often differ from other people, but he must stand up and defend what he believes to be the truth. I think I may safely and fairly say that during the sixteen years I have had charge of the Dairy department I have tried to give the people what I believe to be the truth. I may have made mistakes, and I know I have, but I think you will give me credit for speaking what I conceive to be the truth with reference to the dairy business. (Applause.)

That brings me to the consideration of the topic for the afternoon, and I shall be as brief as I can. In the first place I should like to say we are under a debt of gratitude to Messrs. Hodgson Bros., of Montreal, and Rowson and Hodgson Bros., of London, England, for the great interest they took in this special series of experiments.

I shall divide my subject into seven parts:

1. We compared sweet cream without culture, sweet cream with culture or starter, and ripened cream, conducting altogether 45 experiments.

2. We compared salt and various kinds of commercial preservatives as a means of preserving butter until it reached the market in London, England. We applied these preservatives in both dry and liquid forms in order to compare the relative values of putting in preservatives in a dry form and applying them in the liquid form or dissolved in water.

3. We compared ordinary boxed butter with putting similar butter up in pound prints, and these were enclosed in a special carton we had made for that purpose.

4. We compared cream, delivered in the ordinary cream gathering way and made into butter, with butter made from whole milk.

5. We compared the export and home markets as to financial returns.

6. We tried to get some data on the transportation with reference to getting better facilities.

7. My seventh point is a summary of the whole question.

In a word the highest scoring butter was made from sweet cream without any culture or starter, run directly from the cooler into the churn, and churned immediately we were done separating, pasteurizing and cooling. Will you allow me to say that in my judgment the day is fast going by when the butter-maker of this country can afford to sour the cream as he has been doing in the past, developing a foreign flavor, and getting an acid taste in our fine quality of butter. As a result of careful experiment I feel convinced of the fact that it is possible to make the finest quality of butter

without using any starter, or culture, or souring or ripening the cream in any way whatever. I feel satisfied it can be done if you have the proper appliances for doing it. Do not run away with the idea that I am advising you to do that in a general way next year. I would advise you in all cases of this kind to go slowly. Understand the whole situation before you make any radical changes in your method, but if you have the opportunity of testing this matter, I would like to have you do so, and then send the butter to some of your best customers. Some of our customers say they never tasted butter like that. The girls and teachers at the Macdonald Institute, and I suppose they are as critical a lot as you would find anywhere, have come to me and said they never knew what a fine flavor of butter was until they ate this butter. I think we have educated the people generally up to a false standard with reference to a fine quality of butter.

We found that there was little or no difference in the quality of the butter when it reached Montreal, and when it reached London, whether we used ordinary common borax, which you can buy for 5 or 6 cents a pound, or whether we used some commercial preservatives that cost 10, 12, and 15 cents a pound; and I am satisfied from the work we have done that it is wholly unnecessary for us to pay 15 cents a pound for preservatives, assuming that you feel the need of such, when you can get just as good preservatives for 5 or 6 cents. That is not an opinion; it is the result of practical experiment tested in previous years in our own refrigerator, and this last year shipping the butter to Montreal, and having it scored there, and then to London, England, and having it examined there. The judges did not know what was in the packages; they were simply numbered so and so. It was important that they should not know what kind of preservative was in them, or whether they were made from sweet cream, pasteurized or unpasteurized. We found that prints made August 4th, 8th and 9th from sweet cream from culture, and from ripened cream washed with brine and borax, wrapped in a special carton and shipped August 12th from Guelph, sent to London, Eng., were in more or less rancid condition when they reached London. The report we got was: "They had a tendency to sidiness." I fancy they meant the butter had gone off flavor on the outside. It seems that it is not possible for us to make butter and ship it to London, England, in print form, and have it reach there in good condition. Another objection is that, as a rule, they prefer to make their own prints, and they do not care to handle print butter of some other brand.

We found also that butter made from cream delivered by average farmers—and I think I am safe in saying that about Guelph we have an average class of farmers, no better and no worse than are to be found around any ordinary creamery or cheese factory; some of whom have separators and some use deep cans—was equal to butter made from whole milk. This cream was pasteurized, cooled and churned, and made into butter, packed in 56 pound boxes, and compared with butter made from whole milk cream made in the same way. When scored in Montreal and when scored in London, England, they were given practically the same score; or in other words the butter was as good made from cream delivered by our patrons as butter made separated from whole milk. That indicates that it is possible to make good butter in either way. I think these samples scored about 98 to 99 points. You will find these details in our annual report, and it shows that it is possible to make a fine quality of butter on the cream-gathering system.

As to the financial returns: In every shipment there were from three to fifteen different kinds of butter, and the number of boxes were from

eleven to twenty-two, making in all 8,128 pounds of butter, or 903 pounds of butter per shipment. We received for these 8,128 pounds of butter $1,645.70, or an average of 20.2 cents per pound. On our home market we sold no butter last year for less than 21. cents per pound. I mention this point to show you the relative difference in returns from our home and export markets. I would have you bear in mind that there were special charges on these experimental shipments, and that it was not possible to have the lots uniform. Bearing all these points in mind we consider an average of 20.2 cents per pound a very good price.

They sold in London as follows: June, 106 to 108; July, 110 to 112; August, 114 to 116 shillings per hundred weight.

A word about transportation. Very often the butter-makers are at fault in their methods of caring for the butter, and perhaps are scolded justly because the butter reaches Montreal at too high a temperature. On three different occasions I went down to Guelph to meet what is called the "way-freight," which is the only freight train going through Guelph carrying refrigerator cars, and three different times I was unsuccessful in meeting that train. It was supposed to be in Guelph at nine in the morning. They usually come out for our butter between eight and nine in the morning. I went down on July 6th, when I had been told the train would reach Guelph at eleven forty-five, and I inquired from the man when the train would be in, and he said it left Berlin half an hour ago and will be in in a few minutes. I sat down and waited and waited till half past twelve came, and there was no sign of the way-freight. I went to one of the men and I said, "Where is the way-freight?" and he said, "She has not left Berlin yet." I went to the agent and said, "How is this? I came down to meet this train, and I was told it had left Berlin, and now after waiting here nearly an hour I am told it has not left Berlin." I went out and took the temperature in the freight shed, and it was 74 degrees, and that is where our butter had been since nine o'clock in the morning. I stood around there and kept inquiring about that freight. Then I went home. On August the 10th I went down with the butter. In the meantime I had written to the head agent in Montreal very strongly. Soon after a number of officials called at the dairy to explain that it was difficult to control the way-freight, but they would try and let me know when the way-freight would be in. In order to help matters we began shipping our butter over the C. P. R. However, I went down on August the 10th and took the temperature of the air outside, and it was 76 degrees. The temperature in the west end of the car was 70 degrees, at the door 70 degrees, and at the east end 68 degrees, and this was supposed to be a refrigerator car.

Mr. RUDDICK: How did you take the temperature?

Prof. DEAN: With a thermometer.

Mr. RUDDICK: You opened the door first?

Prof. DEAN: I climbed right into the car as soon as the door was opened. I got off the waggon that contained the butter boxes, opened the door and took the temperature, because as soon as they loaded the butter the train went away.

Another thing I found in that car was that they had store butter in tubs, and the covers had been knocked off them, and there was butter all around the car and when they took our butter off the dray they put it on top of those dirty tubs, and I said to the man, "Why not put that butter at the end of the car?" and he said, "I have not time. I have got to pull right out."

I hold there is something wrong in our methods of transporting butter, and I think you will find that in some cases at least that it has not been the fault of the butter-maker that his butter reached Montreal at too high a temperature.

To sum up the whole question: 1st, sweet pasteurized cream churned in less time than ripened cream and at a lower temperature. A great many people have the idea that in churning sweet cream you have to churn a long time, but that is not our experience.

2nd. The average per cent. of moisture was 13.789, the lowest 13.510. Saltless butter scored higher in nearly every case. I wrote to find out the explanation of that, and the firm in London said that they thought the butter had a flavor due to the salt, showing that it is important that the butter-makers should use pure sale or there is danger in tainting the butter. There was little difference in the butter from sweet and ripened cream, what difference there was being in favor of sweet cream butter.

3rd. There was little or no difference between the results got by using borax and the various commercial preservatives.

4th. The gathered cream butter in the experiments was equal in quality to the whole milk butter.

5th. The pound prints were not satisfactory.

6th. The financial returns were good, but hardly equal to those obtained in our local markets, but we must bear in mind that the export trade makes a suitable outlet for all our surplus butter.

I have tried to bring before you the result of these experiments in the briefest way possible, and I trust I have made them plain to you. (Applause.)

COLD STORAGE AND TRANSPORTATION FOR BUTTER.

By J. A. Ruddick, Dominion Dairy Commissioner, Ottawa.

I can assure you that it would be strange to me to be absent from this Convention, because I think I have attended all your conventions for the last twenty years, except when I was out of the country, and it does not seem at all strange to me to come up to this part of the country, because as some of you know I am pretty nearly home. I was born within sixteen miles of this city.

I have listened with a great deal of interest to what Prof. Dean told you about shipments of butter to Great Britain, and I shall refer to the refrigerator car service.

I do not assume any responsibility for the running of refrigerator cars. There are many things which we are not in a position to deal with. The Government guarantees the running of cars over certain routes, but shippers want to put the whole responsibility of looking after the shipments upon the Government. The Government and its officers are willing to do all they can to improve the service, but there are some things they cannot do nearly as well as shippers.

There is no more important question for the butter-maker to consider than the cold storage, and I am glad to say there has been a marked improvement. Any information which we are able to collect from time to time proved that there is a very decided improvement in cold storage in con-

nection with creameries throughout the country. I think probably more improvement has been made in some of the dairies in Quebec, and I do not intend to deal with that side of the question at any length, because I deal with that matter in my annual report, and any person requiring information on the subject can always secure a copy of the report. The plans cover two different systems, the one system which is known as the "Cylinder" system in which ice and salt are placed in the cylinder. There is another system known as the "Air Circulation" system which we recommend. The cylinder system is very much cheaper to install; where you have an air circulation system the ice chamber as well as the cold storage room requires to be thoroughly insulated. While the circulation system costs more to instal, it is the cheapest to operate, and there is this much to be said in connection with it, that we get the lowest average temperature with the circulation system. Where the cylinder system is used the cylinders have to be kept full all the time, and they use a considerable quantity of salt. On the whole the air system seems to give the best satisfaction, and I recommend that system. I had a few figures taken from the Inspector's report before I came away yesterday.

We know that the refrigerator cars are not supposed to carry anything but butter. Cheese is not allowed in them, because it is always delivered at a high temperature, and it would be injurious to the butter to have the cheese in the car, because it would be impossible to keep down the temperature of the car.

Butter may be divided into two classes. During the past year our instructor was travelling through this western part of Ontario to discriminate and make notation and report as to whether butter was dairy butter or creamery butter. In subsidizing this service the Government had no desire to discriminate against dairy butter, but we find that in going over the temperature that there is a very marked discrepancy between the temperature of creamery butter and dairy butter. I have records from some twenty creameries, and I find the lowest temperature of butter recorded is 32 degrees, and the highest temperature 54 degrees. That gives an average of about 49 degrees. The temperature of dairy butter varies from 59 to 74 degrees, an average of over 66 degrees. It is a question in my mind whether this dairy butter should be allowed in the cars, or whether butter at a high temperature should be allowed to be put in the cars. It seems to me it is just about as injurious to the creamery butter which has been properly chilled as it would be to have cheese loaded into the same car, because the temperature of the dairy butter is nearly as high as the temperature of the cheese. The country merchant who collects large quantities of butter should provide himself with cold storage, and I think it is just as important that this dairy butter should be chilled as it is that the creamery butter should be chilled. I am not so sure but that it would be a wise thing to limit the use of these refrigerator cars to butter properly chilled before it is delivered to the station. If the merchant who handles butter would provide cold storage, dairy butter would not have the bad name that it has in the market at the present time. While farmers might think it was discriminating against them, I believe such a measure would be very much in the interests of those manufacturing dairy butter. I have some figures here showing the average temperature throughout the section of the country, and also the temperature of the cars when they arrive in Montreal. We never tried to take the temperature of the car by opening the door and putting a thermometer inside, because the warm air would get in with the thermometer. None of our records show the temperature of the air in the car because we recognize that

you cannot open the door of a refrigerator car without changing the air. It is impossible to get an accurate record of the temperature in that way. We take the temperature by putting the thermometer into the butter about three inches and in that way we got a fair average temperature, and we also take the temperature of as large a number of packages as possible, and in making a comparison of temperature at shipping point and Montreal we take the temperature of exactly the same packages. We find that the average temperature of butter delivered at the station of the C. P. R. in Ontario was 57.7 degrees; that was the average of 21 tests. An average of 106 tests on the G. T. R. gave 56.9 degrees. This same butter on arrival at Montreal was 4 degrees colder, so that the refrigerator cars chilled the butter 4 degrees en route from here to Montreal. These are the average tests of the butter contained in the cars. There was a considerable quantity of very warm dairy butter placed in the cars. The temperature in the Eastern township was somewhat lower. On the north shore in Quebec the temperature was 58 degrees. I have in my hand several thermographic records. That is a photograph of the original record taken on a car from Windsor on August 25th. The temperature in that car varied from 54 to 46 degrees from Windsor to Montreal. By the use of the thermograph we have been able to determine whether delays have occurred.

Q.—Was that the G. T. R. or the C. P. R.?

A.—The C. P. R. When the car is in motion this thing is so delicate that it vibrates a great deal and makes a white blurred line, and when the car is standing still that ceases and we found where some freight cars were standing for twenty-four hours on the way from St. Catharines to Winnipeg. Coming back to this particular butter car from Windsor, it shows the length of time the car was on the way and the average temperature was from 54 to 46 degrees. I have a great deal of information on this subject, and I still think that the weakest link in the chain of handling butter is at the creamery and from the creamery to the station. I appreciate the difficulties Prof. Dean speaks of in not being able to know exactly when the car would arrive at the station. I have been doing my best to point out to the railway officials the necessity of having their cars operated on a more definite time-table in some way, and I hope we will be able still to have improvement made in this direction. I have always found that where I can give the higher officials on the road instances of neglect they are only too glad to try and correct things. We have found that a great deal of education in connection with the railway employees is necessary in this work, and for that reason we have had men travel over the refrigerator car routes and visit the agents and find out what they know about these cars, and we have found that they do not know very much. I do not know any class of men that seem to take less interest in their work. They get through their work with just as little effort as they possibly can. When our agent arrived at some stations, they did not know anything about refrigerator cars, and had not even received a circular. We have been able to effect some improvement by impressing on the station agents the importance of giving this butter special attention to prevent, as far as possible, unnecessary exposure. On these long runs it is difficult to arrange the way freight so that it will run exactly on time. You never can tell how much freight will have to be handled. Some days there is a large quantity and other days less; of course the iced butter cars must travel by the way-freight. It could not be placed on the other freights because these trains do not stop at every station. In arranging these different routes for iced butter cars we try as far as possible to meet the wishes of the shippers, having in mind all the time what will

be for the best interests of the trade. I find after the circular has been issued it is difficult to change the system, and if anyone has any suggestions to make as to the movements of these cars we would like the information at once, not later than the first of March, because by that time we take this matter up, and it usually takes a month getting it arranged. Last year I sent out circulars over the country for the purpose of getting information. We try to comply with the wishes of shippers as far as possible.

Another point I want to refer to is the day of the week on which the cars start from the western points. Monday has been objected to as a bad day for creamery men and the railway companies claim it is difficult to have the cars properly iced on Monday morning. If the car does not get started till Tuesday it cannot get in Montreal in time to catch that week's steamer. One man wrote to me and said he found that the butter arrived at Montreal on such a day, that it had to be taken out from the car and put in cold storage to keep it until the ship sailed, and I think it should be done with all butter. The time is coming when no butter will be received by steamship companies unless at a proper cold storage temperature. The chamber on a ship is not like a cold storage warehouse; there is no reserve of cooling power there. The whole space is filled at one time and if the temperature of the goods is high it is impossible to have machinery that will cool that and keep that temperature down properly from the beginning. That is why you have some records of temperature across the ocean that gradually reduce. That is unfair to the man who puts his butter into cold storage at Montreal. The butter must be delivered to the steamship company at a low temperature.

I have a record of temperature across the ocean. May the 13th the temperature started in at 22 degrees and was reduced to 15 degrees before it reached the other side. The variation was from 22 to 15, and I consider that a very satisfactory temperature for the carriage of butter over the ocean. I believe the most efficient link of handling our butter is on the ocean from the warehouse at Montreal, where they can command any temperature they desire. I am speaking of the transportation of the produce.

You have heard a good deal about the facilities in Great Britain for handling butter and cheese as delivered on the quays. I had the opportunity of making a personal investigation a year ago last summer. So far as London is concerned the facilities are first-class. I doubt if dairy produce, butter and cheese and that sort of thing, are handled better at any other place in the world than they are in the docks where the bulk of Canadian produce is discharged in London to-day. The warehouse is one of the most complete that I have ever seen. The ocean rate includes handling and storing the produce in this warehouse before being delivered. During the last two years these facilities have been there the London trade has increased considerably, and other places have shown a corresponding decrease, and that very fact is having a very important effect on the authorities of other ports who are looking forward to provide similar facilities. At the port of Bristol they are building one of the finest docks in Great Britain. They are spending $30,000,000. They have good cold storage facilities, and are handling a good deal of butter directly into iced vans, and I believe they are the only iced vans in England. Some delay often occurs in lifting the goods from the railway sheds in Bristol, and it is not as good as it might be in that respect. In Glasgow they have no cold storage factories, and the Scotchmen are not enthusiastic over cold storage. In fact, one importer ordered his butter to be shipped in ordinary cargo, and there are merchants in Glasgow to-day that will tell you that it does not do the butter any good to put it in

cold storage. I think it is at Liverpool that we as Canadians have the most fault to find with the way in which our produce is handled. I am glad to say there is a fair prospect of some improvement being made on the port of Liverpool. The whole of the Mersey is controlled by the Mersey Docks and Harbor Board. No warehouse can be erected without their consent. They will not allow outside corporations to erect anything on their property. It is a very great corporation, and it is a very honorable position to be a member of the Mersey Docks and Harbor Board, but I think they are a little slow in moving. They did not like it very well when I told them that we should have better facilities.

I would like to have the co-operation of all the shippers in arranging as soon as possible satisfactory services, and I shall be glad if you will send to me at any time any specific complaint as to the order of services. We do not accept any responsibility for the operation of the cars, but we are willing to send on any complaint to the proper authorities. Last year there was a clause in the agreement that if a car arrived at Montreal without ice no subsidy should be paid, and we found that the cars were better iced last year than before. A refrigerator will get warmer than an ordinary boxcar if they have no ice, and if they are fairly filled with ice you can depend on the temperature being 50 degrees. The lowest temperature I have ever seen in a refrigrator car was 48 degrees. The car came from Calgary; of course the longer the route the lower the temperature.

Mr. SMITH, Alton: Is the butter taken from the car to the ships on the ordinary drays, or have they iced wagons?

A.—It is all carted to the warehouse and carted to the ships, and that is one of the weak points of our facilities at Montreal. I do not know that they will ever be able to overcome them. There is a proposition to have cold storage on the wharves so that the goods can be discharged from the cars into the cold storage.

Mr. SMITH: I am very pleased that there is a movement being made to get cold storage on the docks, because sometimes a car might leave here and it would not get in in time for the boat.

Mr. RUDDICK: I think it takes longer for the cars to go than most people imagine.

A MEMBER: Which do you find is the drier, the air circulation or the cylinder system?

Mr. RUDDICK: We find the air circulation is drier.

A MEMBER: Consequently there is less trouble from mould?

Mr. RUDDICK: I should say on general principles the drier the cold storage the less danger from mould. There has been a good deal of trouble with our butter moulding, and I think a good deal of the trouble originated at the cold storage at the creameries; they are not always as well kept as they should be; they very often become mouldy. I am satisfied there is nothing will pay the creamery man better than to thoroughly disinfect the inside of his cold storage once a year. I mean to thoroughly wash it with some strong germicide like bichloride of mercury, and thoroughly scrub the whole inside of the creamery cold storage. I had the sheeting taken off the ice chamber at Brockville, and I was very much surprised that there was not the least sign of rot, and I think it was because we have always washed the walls with this solution once a year. If we could get a larger number of our creameries to adopt some such treatment as that there would be very much less trouble with mouldy butter. If you use boxes made from unseasoned wood you are apt to have mould.

A MEMBER: Would whitewash do?

Mr. RUDDICK: It is a good disinfectant, though of course that is not as powerful as this is.

Mr. McLEOD: Would it do to put up racks, and put blocks of ice on them instead of using this solution?

Mr. RUDDICK: No, you would get very poor ventilation, because with the blocks of ice alone you do not get a very low temperature, and you have the place reeking with moisture, and you have not got a proper circulation of air. The workmanship you get in these buildings counts for very much. When I built these four buildings for the Government there was no difference in the plans, but there was a difference in the buildings, because one contractor had to be watched all the time. He tried to put in poor paper, and he would not use good lumber, and the other one wanted to do a good job. If you are building a cold storage you want to pay attention to it yourself, because the average carpenter does not pay attention to it.

Mr. McLEOD: Does the Government continue the bonus for cold storage at creameries?

Mr. RUDDICK: It has not been approved of by this Parliament for another year, but I have no doubt it will be; if you make application before the first of April I should say you would get the necessary forms of application.

ELECTION OF OFFICERS.

The report of the Nominating Committee was received and adopted. See page 5.

INTRODUCTION OF THE NEW PRESIDENT.

President BALLANTYNE: It is my pleasant duty this evening to introduce to you the President-elect of the Dairymens' Association of Western Ontario, Mr. John McQuaker, of Owen Sound. He was elected this afternoon President for the coming year, and I am certain you have made a good choice. Mr. McQuaker has been one of our most valuable members, and he has always taken a deep interest in everything coming forward in connection with the Association. He not only takes a deep interest in dairy matters, but he also takes considerable interest in municipal matters. At the last election in Owen Sound he was elected at the head of the poll as town councillor, and was chosen chairman of the finance committee in that city. He runs a very large creamery, and you can see his interests are very much with the dairymen. I have now a great deal of pleasure in introducing to you Mr. John McQuaker, and he will take the chair for this evening.

Mr. JOHN MCQUAKER: I can assure you it is with pleasure I accept the honor you have done me in electing me as successor to Mr. Ballantyne. The Ballantynes always lead, and where they lead I am perfectly safe in following. They have always been recognized as leaders in the dairy industry in Canada, and I hope they always will be. I come from away up in the north, where we have no cheese factories. I have been a representative of the butter side of the industry, and it is now the turn of the butter people to have the highest office in your gift. Although my chief interest is in the manufacture of butter, I may say we are quite large consumers of cheese. In a retail business with which I am connected we handle a good many cheese during the year. I think I am safe in referring to the Board

of Directors with whom I have been connected for the last few years. I think they will say I have never on any occasion sought to put forward the butter end of the question at the expense of the cheese end, nor shall I ever attempt to do so. I quite readily recognize that the cheese industry is the larger one of the two so far as Western Ontario is concerned, and I shall always be ready in conjunction with the other members of the Board to seek to further the interests of the cheese as well as the butter end of the industry.

My appointment was made only an hour or so ago, and I did not think of making any address to night, because we have men here on your programme who will interest and instruct you, and I shall not keep you listening to me. I may have something to say as we go along. I trust that we, as a Board, and as members of the Western Dairymen's Association, will be able to work together during the year 1907 to make the work as successful as possible. This convention has already mapped out a very considerable amount of work for the Board of Directors, and I am satisfied that they will take it up and carry it out to the best of their ability. (Applause.)

SOME LESSONS FROM THE COOL CURING OF CHEESE.

By J. A. Ruddick, Dairy Commissioner for Canada, Ottawa.

I fancy that the interest in this question of cool curing of cheese is centered now more in the direction of cool curing-rooms and the management of the same than in any other phase of the question. I may say, however, that the experience which we have had in that line of work has convinced us that all our previous exertions were fully justified, and the more experience we have had with the cool curing of cheese the more convinced we are that it is of very great importance to the cheese industry of this country. It has been rather slow work making an impression on the trade in Great Britain. One of the reasons for that has been that the shipments of cheese have been small and more or less isolated, so that it very rarely happens that an exporter has sufficiently large quantities to fill up any particular order.

[See Report of the Eastern Dairymen's Association for first part of Mr. Ruddick's address.]

Just a word or two on the construction of cool curing rooms. Any of you who are looking for information I would refer to my annual report, which contains full plans and specifications, and I would like to say that since that report was published I have been making some investigation with regard to damp proof surfaces, which have to be exposed to moisture, like the melting of ice, or where it is desirable to keep the air in the room as dry as possible, and I have been quite recently successful in getting some very effective materials. I find it is quite possible to cover the interior of a wooden ice chamber, with what is known as metal lath. Nail that on the wood surface, cover it with a thin plaster of cement, and then paint it over with water proof paint. They will guarantee an absolutely water proof surface, and if that can be done with the ice chambers in connection with cool curing-rooms, or in connection with the creamery cold storage, it will add a great deal to the permanence and to the sanitary properties of these rooms or buildings, and it is a thing which I think is well worth looking into on the part of those who may be interested in this question.

One of the greatest problems of all cold storage work is to provide a damp-proof surface. When I say damp-proof, I do not simply mean a cement surface or material to prevent water from pouring through. We have to go a good deal further than that. You know a cement wall or a cement floor would be quite water proof, in the sense that it would not allow water to pour through, but it is not by any means damp-proof. It is practically impossible to make a cement structure damp-proof; a certain amount of moisture will be absorbed and given off.

I referred this afternoon to the fact that I had made some examinations of the ice chambers that have been used five years in Brockville. The sheeting was wood, and I had it taken off, and I was surprised to find it had not deteriorated to any extent. Although the first course of lumber was damp, there were not any signs of dampness beyond that, and no deterioration, and I believe that was due almost entirely to the fact that these walls were thoroughly disinfected every year; and I would like to emphasize that point. I am a strong advocate of having a temperature of about 60 degrees—not allowing it to go over 60 degrees—and the reason I find that temperature is most suitable is because we find the best flavors develop in the cheese at about that temperature. It is very important that the cheese should be properly cured so as to encourage consumption of the article, and I want to make a strong protest against sending cheese that are not properly cured to the British market. If you do that you will check the consumption of cheese just as sure as night follows day, and if you are going to protect your business you must be very careful on this point.

The Chairman: I am sure Mr. Ruddick was extremely interesting on this question. He has given you something to think about. This afternoon he was taken to task for not providing proper transportation, and I would like to say for Mr. Ruddick's encouragement that he may possibly remember that last spring he wrote me asking if I had any suggestions to offer as to the car service from Owen Sound, and I wrote asking that he secure for us a weekly service instead of a bi-monthly service, and after a very short time had elapsed I had word from Mr. Ruddick that he had secured that arrangement, and I want to say that the service was entirely satisfactory during the whole summer. We used the car almost every week, and we had no difficulty whatever; being at the end of the route the way freight always started at the right time, and the car always went away iced, and we always put our goods in it ourselves. We put them in the proper place and in the proper way, and we had no difficulty. Of course ours was with the Canadian Pacific Railway, and that may make some difference. We had hoped to have with us to-night Mr. R. M. Ballantyne, of Montreal, but owing to the fact that that gentleman has met with an accident it is impossible for him to come. We also hoped that our friend A. F. MacLaren, M.P., of Stratford, who is almost inseparable from our Dairy Convention, would be with us to-night to present this handsome trophy, but Mr. MacLaren wired Mr. Ballantyne to-day as follows: "Sorry important business and poor health will prevent my attendance. Hope you will have pleasant, profitable, and successful Convention. Kind regards. Happy and prosperous new year to all." (Applause.) We have with us one of the men who is amongst the early secretaries, if not indeed the first secretary of the Western Dairymen's Association, Mr. J. C. Hegler, of Ingersoll, who will speak to you and select his time for presenting this handsome trophy to Mr. Stedelbauer, who I will ask to take a seat on the platform. (Applause.)

Mr. Hegler opened up his remarks with some interesting stories, and got the audience in a jolly good humor. He then proceeded to say: There is no doubt a great deal is to be learnt still in the manufacturing of cheese and in the curing and marketing of it, and when the people begin to realize the great importance this industry has attained they ought to take advantage of gatherings such as these, and of everything that the Government of the country is doing for the purpose of encouraging the education of the masses. You cannot stop at the cheese-maker; it is not his fault that he gets poor material which he cannot make good stuff out of. The knowledge has to be disseminated down to the patrons, and that is the fountain head of the whole thing. If the patrons would take care of the milk I am sure you would find better results.

Let me give you a little illustration. As you all know there is a large condensing factory at Ingersoll, called the St. Charles Condensing Factory, where they manufacture condensed and evaporated cream. They have a very large patronage. They draw milk from the whole surrounding country, and to some extent they have interfered with the cheese factories in the neighborhood. The patrons say they get more for the milk, and those that do not get their milk into the condensing factory say they are not losing so much because they say the men who send milk to the condensing factories have to take so much better care of their milk. The condensing factory send out an inspector to the farms who inspects the utensils, in which the milk is sent to the factory; the barns and stables, and the cattle and the system of caring for the milk, and every precaution is taken to get pure milk. I think I am safe in saying that it is utterly impossible to make good cheese out of impure milk, and if you take the same precaution about the milk you send to the cheese factory that they do with the milk that is sent to the condensing factory you would have far better results. A farmer came to me and said he had notice from the condensing factory that they would not take his milk any more, and I inquired into it, and I found that his hired man was careless about the stable. He turned the cows into a dirty stable and did not properly clean them, and the result of it was he had to get rid of that man; and having done that and having improved the situation, he succeeded in getting his milk into the factory again.

The farmers of this country are in a better condition than any other class of people. In the olden times if a farmer wanted to borrow $100 he had to pay 8 or 9 per cent., before he got it he had to get down on his knees to the banker and get two or three neighbors to indorse the note. Now, what is the result? The farmers are the men who are the depositors, and if a farmer goes into a bank now he can get all the money he wants at a low rate of interest without any security, and the bankers are taking off their hats to the farmers instead of the farmers taking off their hats to the bankers. All this has been brought about by increased interest in the dairying industry. There is no farmer in Canada but has everything he wants. His family is looked after, and he has a handsomely built house, splendidly furnished. They send their daughters to college, and their sons can be educated in the billiard room if they want to, and there is not a young man on a farm but has his rubber tired buggy and a high stepping horse. Why, some of these farmers are getting their automobiles, and we poor duffers in town will have to look out or we will get run over by them. (Laughter and applause.) They have telephones all over the country, and this great improvement in the agriculture classes has been brought about largely by similar institutions to the one that is meeting here at the present time. (Applause.) The Chairman has kindly asked me to present this

trophy to Mr. Stedelbauer. This is a challenge cup presented to the most successful manufacturer of cheese, and it is presented by the cheese buyers of this district. It is valued at $150, and becomes the property of the man who wins it three times, or who wins it two years in succession. It has never yet become the absolute property of anyone, and that is right.

I would like to see it go around. Mr. J. E. Stedelbauer is the fortunate winner, and I am sure it gives me a great deal of pleasure to present you, Mr. Stedelbauer, with this trophy, and I am sure if you were to tell the truth about it you would say that the success which you have arrived at in the manufacturing of cheese which has enabled you to win this trophy is largely due to the knowledge which has been gained at these conventions, and the instruction that you have received through conventions such as this. It is certainly a thing to be proud of.

Mr. J. E. STEDELBAUER: I am sure I am very proud to have the honor of winning this trophy, and I thank the cheese buyers of Western Ontario for it, and I will do my best next season to make every cheese just as good as the one that enabled me to win this handsome trophy. (Applause.)

A MEMBER: I am somewhat interested in the cheese industry, and I would like to ask Mr. Ruddick how long from the time the cheese leaves here before it gets to the consumer in the old country?

Mr. RUDDICK: That time varies a great deal, but during the early part of the season a great deal of the cheese goes direct from here to the consumer.

A MEMBER: It is a question of supply and demand.

Mr: RUDDICK: That is beside the question I was discussing. It is a question of giving the people something that suits their taste.

A MEMBER: I was at a farmers' institute meeting the other evening, and there was a gentlemen there that stated they had got reports from the Old Country that a small part of our cheese brought nearly the price of the Cheddar cheese of the Old Country, but a great part of it brought a considerably low price, and the reason was because the cheese we shipped was too green. Now I understand the Ontario Government is going to pass measures directing the factorymen as to how they should fix up their factories, and are telling the cheese-makers what they should do in oredr to make the cheese right, and that being the case I think they should also say when the buyer will get that cheese. I believe we are killing the goose that lays the golden egg by shipping that cheese too early. I do not think it is the fault of the salesman in the factory or the cheese-maker, but I think it is the fault of the man who buys that cheese and puts it on the British market. If there was legislation that the cheese would not be sold, and if the buyer had to put it in cold storage until thoroughly cured, and send it to the Old Country, it would be a great deal better.

Mr. RUDDICK: I would like to take issue with that view of the case, because by that we are throwing the blame on somebody else. This cheese business is your business. It does not belong to the buyers, and why should we not run our own business.

A MEMBER: I am only a farmer.

Mr. RUDDICK: You are exactly in the same position. You have an interest in the cheese business. The cheese buyers will look out for themselves. I do not think your idea is the right one. I think you should take the view that it is your business, and that you should run it and not allow an outsider to run it, because I consider a cheese buyer is an outsider. He is not interested in your end of the business. It does not make any difference to the average cheese buyer whether the cheese business goes to smash

or not, but what are the farmers going to do if the cheese business goes to smash. Now I wish you would take hold of this question, and not depend on someone else to conduct your business for you. I may be wrong, but I said I do consider the cheese buyer is to blame for encouraging it, but the responsibility goes back to the people to whom the business belongs, and who are going to suffer if it is affected.

A MEMBER: The Government says I shall put that milk into the factory in such shape; that the cheese-maker shall put it in such shape to make cheese, and the factory must be in such a shape; and now I want to say if that is going to take place, why not put that cheese on the market when it is in the best possible shape. I am not in a position to stop that thing.

The CHAIRMAN: If salesmen refuse to sell it that will stop it.

DAIRY DEVELOPMENT.

By C. C. JAMES, DEPUTY MINISTER OF AGRICULTURE, TORONTO.

Colonel Hegler has been telling us about the prosperity of the farmers and the dairymen. Perhaps some of you think he was exaggerating. A good many of us know he was not exaggerating. He was simply stating a bald and pleasant truth. A short time ago the announcement was made in the Toronto papers that the headquarters of a British Loan Association were to be moved from the Province of Ontario to Manitoba, and the reason given by the manager was that he could no longer do business with the farmers of this Province. The farmers were becoming so well to do, and they had so much money in the bank that there was very little loaning to be done, and they had to seek new quarters, and were going off to Manitoba and the North-west.

I could take you to a small section in the eastern part of Ontario, and if you had gone there ten years ago you would have found very few cheese factories, and the farming business of that community was in a rather down-hearted condition. Hard times of the worst kind were being felt; but the dairy industry came in and began growing and growing, and a few years ago they formed a cheese board in one of the near-by towns, and the sales of cheese on that cheese board this past year aggregated no less an amount than $700,000. Just picture to yourself what the effect of that has been. Here is a little community surrounding a small town, and in one year $700,000 in cash is brought in from the sale of only one line of produce, although of course that is the main produce of that district. In addition to that there are other lines of production, but that one line brought into that one town, and distributed throughout the community surrounding it, the sum of no less than $700,000. A man who had visited that town ten years ago recently went back there on business in connection with our Department, and he told us on his return the change that had taken place there was simply marvellous. A new feeling was in the community. The farmers had progressed, and they were comparatively well to do, everything was on the uplift, and the whole thing was due to the fact that dairying had been brought in there and had progressed along proper lines. Reference was made to olden times by two or three of the speakers. I was just thinking as I sat here that after all we have been making most astonishing progress, although some of us think it might have been much greater.

It is just twenty-one years ago last week since I began work in connection with what is now the Department of Agriculture, and I tried to run over the changes that have come over agriculture, and especially the dairy conditions of this Province in those twenty-one years. At that time the only thing we had in connection with the dairy work of the Province of Ontario was two or, I think, three dairy associations; absolutely nothing else. We had no dairy school. We had no dairy department. We had nothing working for the dairy interests of this Province but the two or three Dairymen's Associations. I remember that at the Agricultural College there were the remains of an old discarded cheese factory; nothing being done. The vats and the other apparatus were standing there covred with cobwebs. Then for the first time they appointed an instructor in dairying, and he came into the work just at the same time that I did.

We come to ten years later, 1896, and we had made some progress, not such a very great deal, but we had three dairy schools started. One was at Guelph, and the property had been purchased at Strathroy for the Western, and the Eastern school was in operation at Kingston. In that year there was expended for dairying work, apart from the general agricultural work $22,000. We had grown from the small grant in 1886 of about $8,000 to $22,000. Let us take another jump of another 10 years and come up to 1906, and we find that last year we expended, over and above the revenues, a sum of not less than $50,000 for purely dairy work in the Province of Ontario. In 1896 we expended altogether for agricultural purposes in this Province, $191,000, and last year we expended $377,000. So you see that we are making progress, and some of you who have at times become a little impatient and think we are not going as fast as we ought to, would do well to get these things into your mind and not to become impatient. A great deal of that money is spent in connection with general agricultural knowledge, but dairying gets its share along with other work. For purely dairying purposes we spent last year $50,000, as against $22,000 in 1896. The appropriation for agriculture as a whole has not quite doubled, but the appropriation for dairying work in particular has more than doubled. So that I think you will agree that the dairy end of the work has not been overlooked, and has been fairly well looked after. I am not in a position yet to tell you just what we are likely to do this year. How far we are going to advance upon that is not for me to say, but certainly there will be no backward step; there will be an advance.

The suggestion was made just a moment ago by a speaker in the audience that in the settlement of this question Mr. Ruddick has raised the strong arm of the law ought to be invoked. Well now, I think there is room there for a first-class argument, and that is when and where and under what circumstances should we invoke the law to do certain things, and when and where should we try to accomplish the same thing by persuasion, by education, by agitation? The law is simply a method of doing things prescribed by Parliament, and it has power behind it, and that power behind it is the general approval of the people. If we could get that general approval of the people at work from the other end, of course we would be accomplishing a great deal more. In regard to certain things we find that we have to resort to the rigors of the law to accomplish what we want, but the less law we have in this country the better for it, and the more we can develop and uplift the dairy industry of this country by education, by example, or by what we may call agitation, and the less we can do it by law the better it will be for our dairy work. And so, you see, when questions come up for consideration, such as you are presenting here at this conven-

tion, that the law shall do so and so, and that the law shall say so and so, you must very carefully take this into consideration, that the men who are making our laws have to think of these questions from an entirely different standpoint from which you consider it, and they are very loth, indeed, to make laws to do anything that could be better accomplished in some other way. You will generally find that the advocates of law making are likely to run ahead of all popular opinion. We have got on pretty well in connection with the dairy development in this Province without the enforcement or enactment of very vigorous or rigorous laws. It may be that in the future development of it, it will be necessary to lay down much more stringent laws than we have had in the past, but I think you will find that when you come to confront the law makers of the country with your proposition they will very carefully analyse the whole case from this standpoint: Can this work be done better by the education of the people, or must we resort to law to accomplish it? That perhaps is a standpoint that does not present itself to you so forcibly as it will to those who are concerned in making the laws of the country.

We have accomplished a great deal in connection with dairying in this Province in the last ten years, and if we make the same progress in the next ten years that we have in the past, the development of our dairy industry will have assumed enormous proportions. And yet we go on year after year holding conventions, having sessions of our dairy schools, sending out our instructors, and when we come back at the beginning of the year the same old questions seem to crop up again and again and again, and we have after all to go back to the same difficulty; and we begin to wonder if these difficulties will ever be removed or successfully met by conventions, or by instructors, or by the rigors of the law. I will guarantee there have been questions proposed and propounded in connection with this convention that have been brought up and discussed and partially settled at every convention held for the last twenty-five or thirty years, and you come back to this point every time: what we want is good raw material.

What a complicated question this dairy question has become. Here are the cheese and butter buyers, the exporters, who Mr. Ruddick has told you, can well look after themselves, and I guess they can. We do not erect schools or hold conventions or send out instructors to tell the cheese buyers or exporters how to carry out their business. They get their training in a certain line of work in the business centers of Ontario and Quebec, and we can leave them out; they will look after themselves. Next to them, however, are the cheese-makers and the butter-makers, and what have we done for them? We have established three dairy schools in this Province, and to supplement that work we have been sending out no less than thirty-five instructors during the past year to help and assist them. I think we are doing fairly well, and if we keep on improving along these lines, it will not be very long before it will be as necessary for the cheese-maker or butter-maker in the Province of Ontario to have his certificates to hang on the wall as it is for the medical man to have his diploma to hang in his surgery. That may not be done because of law, it will be done because of the necessities of the case. Whether by law or without law, there are those of us here to-night who will see that accomplished in a very short time.

Then there is the third class, the producers, the patrons, the milk producers of this country. Now the buyers will look after themselves. We have been doing fairly well and are proposing to do still better for the makers, and I see they are beginning to stand up and declare themselves of

greater importance in connection with this work than in the past. You can have the most skilful and the best trained buyers in the world, and you can have the best trained and most skilful makers of butter and cheese that any country can produce, but if you have not the producers of the raw material, of what value is it all? Now of these three classes the most important and the biggest class is the producing class, and until we can in some way or other solve the question of how to improve the raw material that goes into this great manufactured product, we will have to go on holding conventions, and conducting dairy classes, and holding dairy institutes, and sending out bulletins and reports, and continue to inspect and carry on the work in the same way year after year. We have not solved that question, and we do not seem to be in a fair way of solving it; and until we do solve it we will simply be working at this question from the wrong end. Is it not about time that we became a little more rational in our method of working along these lines. I do not know who is at fault, whether it is the Department, or the dairy schools, or the instructors, or the conventions, or the people themselves. I am not going to give you my opinion in connection with that. But until we can get hold of the great producing classes of this country, and make it a necessity that nothing but first-class milk, and the best quality, shall be sent to our factories, we cannot expect to put this dairy industry upon a sure and steadfast basis. How are we going to get into the farmers' homes? How are we going to get hold of the farmer himself? How are we going to compel him to keep his stables clean; to produce the best food for the feeding of his animals; to handle his milk in a clean manner, and to have it delivered at the factory in first class shape? Are we going to do it by passing laws, and saying that the farmers must do so and so; or are we going to do it by attending these dairy institutes and conventions? We have been holding farmers' institutes and conventions for a great many years. They date away back to the year 1883. We have been preaching the doctrine of cleanliness to the farmers of this country for over twenty years, and a great deal of improvement, of course, has taken place in that time. But a new class of producers have come up, and we have got to go back and go all over the work again.

Let me tell you that the first genuine ray of hope I have seen in connection with this work came into this question, as far as I am concerned, in the month of December, when I saw gathered at the Agricultural College 400 or 500 women from the farms of the Province of Ontario. It was the most inspiring convention I ever saw, and the most interesting audience I ever addressed. Just picture to yourself a room like this packed to the doors with women from the farms of the Province of Ontario, and every woman sitting there with her pencil and note book taking notes of what was going on. I said to myself as I sat there and looked at them, "We are at last getting a grip on the agricultural community of this country such as we never had before." When 400 or 500 women from all parts of the Province of Ontario will come from the farm homes to a convention of that kind, meaning business, and to take up questions of vital importance to the agriculturists of this country, there is a hope that at last we are going to do something, and we are going to begin at the right source. The women of this country can do what the men cannot do, (applause), and they will make the men of this country do what they won't otherwise do. (Applause.) If the farmers' wives and daughters of this country tell the farmers that they have to put their stables in a clean condition; that they have to carry on their work in a clean way; that they have to keep their implements in a clean manner and send the milk to the cheese factory in a clean form,

take my word for it, it will be done, and if it is not done they will know the reason why. We have at last got our foot into the farmer's home, and until you can revolutionize the farm home life of this country there is not much hope of permanent success. It is all very well for the farmers to leave home and come to London or Ottawa for a week or three days' holiday, have a pretty good time listening to the speeches, and then go back home and perhaps not be able to tell very much of what went on, except that they heard some good songs and some capital stories, and had a good time. But that is not what is going to revolutionize this country. You have to send men home with determination that they are going to clean up and do things better than they ever did before. The centre of the farm work of this country is not on the front concession or on the back road; it is not out in the stable or in the fields, but it is right in the home where the farmer lives, and if we can only start within the four walls of that home we will accomplish a great deal more than we have been able to do through conventions or dairy schools, or anything else. If we can deliver the gospel of cleanliness in the farm homes of this country there is hope of doing something; and when I saw that women's convention listening to addresses on the subject of pure milk production, and of what it meant to the health and wealth and happiness of this country, I said, "This is the best dairy convention I have ever attended, and this is the best work we have ever undertaken in this Province." The farmers' institute work grows very well, but the women's institutes of this country are growing at a tremendous pace. You have no idea of the great social revolution that is taking place in connection with the agricultural life of this country. I pleaded with these women to go home and demand that something should be done in the rural public schools of this country to help out our agricultural work. I said to them: "If you will go home and tell your husbands and your brothers that the rural school life of this country has to have some rational education put into it, then we will see it done before some of us die; if you do not do it, I doubt very much if we will see anything practically accomplished along that line." If we can get the farmers' wives and daughters of this country to work on this question of pure milk, whether for home consumption or cheese making and butter making, and if at the same time we can have introduced into our rural schools some simple instruction so that the boys and the girls will get some little knowledge of what milk is, and of the first principle and value of milk as a food and the necessity for its being kept absolutely clean, then and not till then will we have this question finally settled along these lines. We will simply have to meet year after year in convention and go over the same old ground again and again, meet the same old difficulties, and we will not make half the progress that we should make.

This great dairy industry has been the salvation of the Province of Ontario. If it had not been for the development of our butter and cheese industry the conditions of the Province of Ontario would be of most lamentable nature. It has been the salvation of the agricultural classes, and upon the development of the agricultural classes of this Province has been built up all the other industries, manufacturing, etc.

Why are we having such fairly good times in this country to-day? Simply because the farmers have been having good times. Why have they been having good times? Largely because of the development of our cheese industry, our butter industry and the allied bacon industry. The beef industry has come up at the same time, but you cannot get away from the importance of the dairy industry. The men who have their hands upon the financial pulse of the country will tell you that if they know the condition

of the dairy industry to-day they can tell you what will be the condition of the financial world to-morrow; and those of us who are giving it their closest attention are only too anxious that not only shall we hold what we have gained, but that we shall gain a great deal more. And so I say this matter will never be satisfactory until we have effectually settled that question, namely, how shall we persuade the farmers of this country to give to our cheese and butter makers milk in a first class condition?"

Anything we can do along these lines, whether by education, agitation, or law-making, ought to be done. But remember that if we go at it along educational or agitational lines we will accomplish it far more securely than if we compel the farmer at the point of the pistol, so to speak, to do it. In fact, it is very questionable whether we can compel him to do that which he does not want to do.

This is a question that does not concern me or you or somebody else in particular, but it concerns all of us. It is a question that the men and women engaged in the dairy business have got to take to heart.

I trust the members of the Western Dairymen's Association will do their full part to hold their own in connection with this movement, and see that the gospel of cleanliness dominates the whole agricultural community.

RESOLUTIONS

Mr. J. N. Paget presented the following resolutions, all of which were adopted:

That, whereas, the success and educational value of this Convention, and the interest taken therein, is attributable, in a very considerable degree, to the presence of the speakers who have so kindly addressed our meetings, we desire to express our hearty thanks for their assistance and presence throughout the various sessions.

Resolved, that we, the members of this Association, desire to express our appreciation of the kindness of the Mayor and members of the London City Council in furnishing the use of the Auditorium and City Hall free of charge for the purposes of this Convention and Dairy Exhibition.

Resolved, that the thanks of the convention be, and they are hereby tendered, to the Canadian Salt Company, of Windsor, Ontario, through their General Manager, Mr. Henderson, for the very handsome medals and badges presented by the Company to the members of this Association.

That, whereas the growth of mould in butter is the most serious trouble that butter makers have to contend with and is the cause of immense loss each year to the butter industry of the country;

And whereas its causes are unknown, resolved, that it is desirable that the Department of Agriculture shall take such steps as may be necessary to have a thorough investigation of this matter made by a competent dairy chemist and bacteriologist who shall, if necessary, devote his whole time to this work.

That whereas petitions signed by several hundred cheese and butter makers have been presented to this Convention praying for the establishment of a standard of qualification for makers and asking that, after some date to be set, no maker shall be allowed to take charge of a factory unless he has had at least three years' experience in a factory or holds a diploma from a dairy school, be it resolved that in the opinion of this Convention it is

desirable that our cheese and butter makers should be as well qualified as possible, and therefore we endorse the object of the petitioners and request the Ontario Department of Agriculture to give this matter its early and careful consideration.

Resolved that, whereas it has been shown that a considerable proportion of the factories and creameries of Ontario, but particularly in Eastern Ontario, have been located on sites not providing suitable sanitary facilities, and whereas the Province of Saskatchewan already has legislated along the line to be proposed; that in the opinion of this Convention the time has come when greater care should be exercised in Ontario in connection with the erection of cheese factories and creameries, and we would recommend that steps be taken to prevent the building of additional factories until their sites and plans have been submitted to the Department of Agriculture for approval, and until it has been shown to the satisfaction of the Department, or of some competent board appointed by the Department, that the erection of the proposed factory is in the best interests of the section where it is proposed to be built.

Whereas the Dominion Government has announced its decision to discontinue the operation of the cool cheese curing rooms established in 1902 on the ground that they have served the purpose for which they were intended, resolved that this Convention place on record its acknowledgment of the great value of the illustration which they have afforded, and the impetus which through their operation has been given to a most important movement for the betterment of the Canadian cheese industry, viz., the cool curing of cheese.

The Convention then adjourned.

DAIRY SCHOOLS OF ONTARIO.

CENTRAL DAIRY SCHOOL.

(In connection with the Ontario Agricultural College, Guelph.)

G. C. Creelman, B.S.A. M.S.....President
H. H. Dean, B.S.A.....Professor of Dairy Husbandry.
R. W. Stratton .....Instructor in Separators
C. W. McDougall .....Instructor in Butter-making.
Alex. M. McKay .....Chief Instructor in Cheese-making.
C. H. Ralph .....Assistant instructor in Cheese-making.
Geo. Taylor.....Instructor in Milk-Testing.
Miss Laura Rose.....Instructress in Farm Dairy.
S. F. Edwards, M. Sc.....Professor of Bacteriology.
H. L. Fulmer, B.S.A.....Instructor in Dairy Chemistry.

A glance at the Register of Students for the Dairy Class of 1907, shows that it was a cosmopolitan one. The following provinces, states and countries were represented in the Class: Ontario, Quebec, Alberta, British Columbia, New York, Vermont, Massachusetts, Pennsylvania, England, Scotland, Switzerland, Argentine Republic, and Japan. Thirty-four wrote on the final examinations at the end of the term in March, of whom seventeen took the Full Course of Cheese and Buttermaking; ten were specialists in Buttermaking; and seven took the Farm Dairy Course. During the past two or three years we have discouraged students from attending for but a week or two, believing that more good is accomplished by having a smaller number remain for the full term of three months, rather than having a larger registration, many of whom remain only for a sufficient time to be able to say that they have attended the Dairy School, but who have really never become students. We have heard of cases where men have used this fact as a lever to get positions, whereas only those who have taken the full term's work of three months are entitled to say they have been students at the Dairy School. We believe that an injustice has been done the Dairy Schools by such misrepresentations. The term of three months is all too short for the work to be covered. Even our best students say the time is too short. It may be necessary to extend the term in the near future, or make the Course one of two terms of three months each.

For 1908, there will be some rather radical changes in the Dairy School Course, with a view to making better equipped men for our factories.

Among these changes (which are announced in the Short Course Calendar of the College to be issued not later than July, a copy of which can be had free on application to the President of the College) are the following:

1. Only those who have had at least one season's experience in a cheesery or creamery will be allowed to enter the Factory Course. Any others who wish to take the Dairy Course will be required to enter the Farm Dairy branch of the School. The object of this regulation is to have men of experience in the Factory Course, who will have learned the rudiments of factory work before coming to the School. These men will not need to spend so much time on routine, and will thus have more time for laboratory practice.

2. One-half of the student's time during the term will be devoted to laboratory work in Chemistry, Bacteriology, and in the shop. It is becoming more and more recognized that the sciences of Chemistry and Bacteriology are at the foundation of scientific and practical butter and cheesemaking. A man who does not understand the composition of milk and milk products, or know something of the causes of ferments, good and bad, is a weak man in a factory, no matter how good a practical man he may be. To meet this growing need, twenty-two periods of two and one-half hours each of laboratory work in both Chemistry and Bacteriology will be given during the course of 1908. More attention will also be given to boilers, engines, and repair work in the shop. Every factory needs a set of piping tools and a soldering outfit: also a man who knows how to use them. In this way dollars and valuable time are saved at the factory.

3. The subjects of Chemistry and Bacteriology seem rather difficult, and some students think they are of little practical value. This is not true, but these subjects will be made optional for Farm Dairy students. A student may take the Course and receive his Certificate of Standing in the Farm Dairy without being required to take either Chemistry or Bacteriology. This opens a way for students to get most of the benefits of the Course, yet does not compel them to take subjects which may seem difficult to men whose early education has been neglected. However, the Farm Dairy Certificates will not be sufficient for those who wish to take charge of factories. Doubtless, in the near future, men will be required to have certificates from a Dairy School before they are allowed to take charge of a cheesery or creamery.

We are aiming to make the Course of 1908 as scientifically practical as we can. "Unless science makes progress practice marks time." Creamery owners are willing to pay good wages for carefully trained men. Since the session of 1907 closed we have had inquiries for an average of three or four butter and cheese makers per week at wages of $60 to $75 per month. A combination of trained brain and hand is bound to win in the race for life. Dear reader, are you content to be an *ordinary* cheese or butter maker?

H. H. DEAN,
Professor of Dairying.

EASTERN DAIRY SCHOOL, KINGSTON.

G. A. Putnam, B.S.A., Toronto ..... Director.
J. W. Mitchell, B.A. ..... Superintendent.
G. G. Publow ..... Instructor in Cheese Making.
J. H. Echlin ..... Assistant in Cheese Making.
Jas. Stonehouse ..... Instructor in Butter Making and Separators.
J. Buro ..... Assistant in Separators.
Jas. Irwin ..... Assistant in Butter Making.
J. F. Singleton ..... Instructor in Milk Testing.
W. T. Connell, M.D. ..... Bacteriology.
W. L. Goodwin, D. Sc. ..... Dairy Chemistry.

As regards the attendance, the quality of work done by the students, and the milk and cream supply, the session just closed was, to myself and staff, one of the most satisfactory in the history of the school. Three courses in all were given, viz., a Long Course extending from January 2nd to March

7th, a short three weeks' course following this and a brief course at the close of the session for syndicate instructors.

In all, 127 students were enrolled and attended the school during a longer or shorter period. The chief course of the session, the one that we lay the most stress upon, is our Long Course, and it is only to students who take this course that examinations are given and, if successful, certificates awarded, to be followed later by diplomas. Perhaps the most pleasing and promising feature of the past session was the large number of students that entered the school at the beginning of our Long Course, remained throughout and took the final examinations. In this connection the following table, giving the number of Long Course students that took the final examinations during each of the past three sessions, should prove of interest:

Session of	1905	19 students.
" "	1906	26 "
" "	1907	40 "

This large increase from year to year is very gratifying, indeed, as it is indicative of an awakening on the part of cheese and butter makers to the importance of thoroughly qualifying themselves for their work. The owners of factories are becoming more and more careful as to the men they place in charge, and are demanding well trained makers for these positions, and it will not be many years, we hope, until the holding of a certificate and diploma from one of our Dairy Schools will be required of young men seeking positions as factory managers. As tuition is free in our dairy schools, a dairy school course is quite within reach of every young man, and it says little for one who has not sufficient ambition to take such a course and thoroughly qualify himself for his work. A move in the right direction has been made this year in exacting of every syndicate instructor that he hold a Dairy School diploma.

The subjects taken up in our Long Course are, Dairy Science, Cheese-Making, Separators and Creaming of Milk, Butter-Making, Milk-Testing, Dairy Bacteriology and Dairy Chemistry. A special lecturer in the last named subject has been added to our staff within the past two years, and our students now receive their chemistry lectures in the Chemical Laboratory of the School of Mining and Agriculture, where the lectures are demonstrated and the students are required to do practical work. This addition to our course has broadened it greatly and has been much appreciated by our students. While the students receive lectures on each of the foregoing subjects, the major portion of each day is spent in the different departments of the school where practical cheese-making, butter-making, milk-testing, etc., are conducted and the students afforded every opportunity to put into practice the principles taught.

The milk and cream supply during the past session was the most satisfactory in years, being regular in its delivery and quite satisfactory as to quantity. As practically all of the creameries in Ontario are cream-gathering creameries, our students were given a thorough training in the handling of hand as well as power separators, and arrangements were made for a regular supply of gathered cream.

While sufficient experimental work is done in our school to awaken in the students a spirit of investigation and train their powers of observation, the major portion of the practical work in the school consists in the teaching of the best methods of handling milk and cream and making butter and

cheese from the same. It is our desire and aim not only to lay a thorough foundation in the principles of dairying with our students, but to teach them how milk should be handled to make the most and best quality of cheese and butter from it.

Respectfully submitted,

J. W. MITCHELL,
Superintendent.

WESTERN DAIRY SCHOOL, STRATHROY.

GEORGE H. BARR ..... Superintendent.
J. R. BURGESS ..... Instructor in Cheese-making.
FRED. DEAN ..... Instructor in Butter-making.
E. N. HART ..... Instructor in Separators.
FRANK HERN ..... Instructor in Milk-testing.
S. F. EDWARDS, M. Sc ..... Bacteriologist.
H. L. FULMER ..... Instructor in Dairy Chemistry.

During the term of 1906, twenty-eight cheese and butter makers attended the School. Some of these could only remain for a short time on account of their factory work.

Thirteen wrote on the examinations. Five examinations were held during the term, and the standing of the students was based upon these five examinations.

This arrangement in regard to examinations seemed to give the best of satisfaction both to the students and staff. All the students passed the examinations. Five passed with first-class and six with second-class honors.

Considerable experimental work was caried on in making butter, preparing cultures, testing cream by measure and by weight, and handling curds in different ways.

In making butter it was found quite possible to increase or decrease the percentage of overrun by different methods of churning the cream and washing the butter. We also had very good results from using a culture carried on in cream.

In comparing the testing of cream by weight and by measure, there is no doubt that the correct way is to weigh the sample for the Babcock tester.

Weighing gives equal justice to the producers of both rich and thin cream, while measuring with the pipette does not. Especially is this so with sour cream.

In cheese-making, cutting the curd fine and dipping it with a small acid, even if in a soft condition, gave the best results in handling overripe milk.

GEO. H. BARR,
Superintendent.

ANNUAL REPORTS

OF THE

Live Stock Associations

OF THE

PROVINCE OF ONTARIO

1906 and 1907

Dominion Cattle Breeders' Association
Dominion Sheep Breeders' Association
Dominion Swine Breeders' Association
Ontario Poultry Associations
Provincial Winter Fairs
Ontario Horse Breeders' Association
and Exhibition
Ontario Spring Stallion Shows

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1907

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TORONTO.

To the Honourable William Mortimer Clark, K.C.,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

The undersigned begs to present herewith for the consideration of His Honour the Reports of the Live Stock and Poultry Associations for 1906; also the Reports of the Provincial Winter Fairs, the Reports of the Ontario Horse Breeders' Association and of the Spring Stallion Shows held in Ontario in 1906 and 1907.

Respectfully submitted,

Nelson Monteith,

Minister of Agriculture.

Toronto, 1907.

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DOMINION CATTLE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, February 5th, 1907 at 11 a.m. The Vice-President for Ontario, Arthur Johnston, was in the chair.

On motion the minutes of the last annual meeting were taken as read.

REPORT OF THE EXECUTIVE.

The Executive submitted the following report:

Provincial Auction Sales of Cattle. Provincial Auction Sales of Cattle were held during 1906 at Guelph, Port Perry and Ottawa, on February 27th, March 2nd and 9th respectively.

The following are the numbers of animals sold and the average prices:

Guelph: 15 females sold for $1,012.50; average, $67.50; 34 males sold for $2,685; average, $78.97; 49 animals sold for $3,697.50; average, $75.45.

Port Perry: 11 males sold for $951.00; average, $86.45; 12 females sold for $946.00; average, $78.83; 23 animals sold for $1,897.00; average, $82.47.

Ottawa: 20 males sold for $1,500; average, $75.00; 16 females sold for $1,295; average, $80.93; 36 animals sold for $2,795; average, $77.63.

At the present time Provincial Auction Sales are being arranged for Guelph, February the 27th; Port Perry, March 1st, and Ottawa, March 8th. The Ontario Department of Agriculture has undertaken to arrange for the general advertising for these sales. This does not include the advertising in the local district. Besides this the Department has agreed to pay the freight on all animals purchased by residents in Ontario to go to the owner's station in Ontario.

Transportation of Stock. During 1906 four cars of pure-bred stock were shipped to the West These cars contained 16 horses, 41 cattle, 25 sheep and 14 swine. The stock was collected from 48 breeders in Ontario, and was shipped to 60 points in the West between Winnipeg and the Pacific Coast. The freight collected amounted to $1,281.72, and the expenses of sending out the cars were $1,253.11, leaving a balance to the credit of the cars of $28.61. This, together with the balance of $15.41 to the credit of the cars at the beginnning of the year, now makes a fund of $44.02 to provide for possible overdrafts.

As this method of shipping stock is of great value to people who sell small lots of stock to Western buyers, it is desirable to give the rates as much publicity as possible. We, therefore, reprint the following from the Report for 1903.

Schedule of Rates for Stock to Manitoba and the North-west in Association Car. The following are particulars of rates charged for registered live stock in Association car. These rates include transportation,

care and feed during the time stock is in Association car. If it is necessary to ship to some point to meet the car, or if it is necessary, to re-ship from the main line in the West to the destination, these charges in each case will be extra. Registration certificates must, in all cases, be produced for the inspection of the station agent at the shipping point.

The main line of the Canadian Pacific Railway, through Manitoba and the North-West Territories, is divided into the following sections:

Section 1, Winnipeg and East thereof.
" 2, Bergen to Oak Lake.
" 3, Routledge to McLean.
Section 4, Balgonia to Aikens.
" 5, Swift Current to Bowell.
" 6, Suffield to Calgary.

CATTLE.

Bulls.

Age.	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 6 months	$6 00	$6 50	$7 00	$7 50	$8 00	$8 50
6 to 12 "	8 00	8 75	9 50	10 25	11 00	11 75
12 " 18 "	10 00	11 00	12 00	13 00	14 00	15 00
18 " 24 "	12 00	13 25	14 50	15 75	17 00	18 25
Over 24 "	14 00	15 50	17 00	18 50	20 00	21 50

Heifers and Cows.

Age.	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 6 months	$6 00	$6 50	$7 00	$7 50	$8 00	$8 50
6 to 12 "	8 00	8 75	9 50	10 25	11 00	11 75
12 " 18 "	9 50	10 50	11 50	12 50	13 50	14 50
18 " 24 "	11 00	12 00	13 00	14 00	15 00	16 00
Over 24 "	12 50	13 50	14 50	15 50	16 50	17 50

HORSES.

Stallions 10 per cent. more than bulls.
Mares 10 per cent. more than cows.

PIGS.

Must be crated in all cases.

Weight (including crate).	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 50 lbs	$1 75	$2 00	$2 25	$2 75	$3 00	$3 25
Over 50 to 100 lbs.	3 00	3 50	4 00	4 50	5 00	5 50
" 100 " 200 "	5 00	5 75	6 50	7 25	8 00	8 75
" 200 " 300 "	7 00	7 75	8 50	9 25	10 00	10 75
" 300 " 400 "	9 00	9 75	10 50	11 25	12 00	12 75
Over 400 lbs	11 00	11 75	12 50	13 25	14 00	14 75

SHEEP.

Three sheep or under must be crated.

Weight (including crate).	Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Sec. 6.
Under 100 lbs.	$3 50	$3 70	$3 90	$4 10	$4 30	$4 50
100 lbs. up to 200	4 00	4 20	4 40	4 60	4 80	5 00
200 and over	4 50	4 70	4 90	5 10	5 30	5 50

When three sheep from one shipper to one consignee are received in one shipment they will be carried without being crated. In such cases when from five to nine sheep are received, fifty cents will be deducted for each sheep from the above quotations; when the number is ten or more sheep one dollar will be deducted.

Provincial Winter Fair, Guelph. The following are the entries in the open classes for Beef Cattle and Dairy Cattle at the Winter Fair at Guelph, 1906, together with the prizes offered in each class:

Beef Cattle.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	25	$371 00	$348 00
Herefords and Aberdeen-Angus	19	282 00	231 00
Galloways and Devons	12	150 00	135 00
Grades or Crosses	38	395 00	360 00
Export Steers	6	100 00	100 00
	100	$1,298 00	$1,174 00

Dairy Cattle.

Shorthorns	8	$285 00	$ 95 00
Ayrshires	17	186 00	169 00
Holsteins	6	235 00	190 00
Jerseys	7	135 00	....
Guernseys	..	135 00	....
Grades	3	135 00	15 00
	41	$1,111 00	$469 00

Eastern Ontario Live Stock and Poultry Show. The following statement shows the number of entries made in the Beef Cattle and Dairy Cattle Departments at the Eastern Ontario Live Stock and Poultry Show at Ottawa, 1906; also the prizes offered in the different classes and the prizes paid:

Beef Cattle.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Shorthorns	17	$192 00	$166 00
Herefords and Aberdeen-Angus	11	100 00	70 00
Galloways and Devons	..	100 00	....
Grades or Crosses	32	192 00	192 00
Export Steers	6	90 00	90 00
	66	674 00	518 00

Dairy Cattle.

Shorthorns	3	$100 00	$65 00
Ayrshires	5	125 00	75 00
Holsteins	15	200 00	195 00
Jerseys and Guernseys	3	100 00	65 00
Grades	7	100 00	75 00
	33	625 00	475 00

Importation of Cattle. A great many cattle are being imported into Canada free of duty, which are not recorded in any of the Canadian books of record for the various breeds. The result is that some of the owners afterwards record them here, but others continue to record them in foreign records. The term "pure-bred," as applied to cattle in Canada, should refer to cattle registered in the Canadian National Records. We now have a complete system of National records for different breeds of live stock, the standard for which is as high as that of any records in the world. They are authorized by the Government of Canada, and are conducted by the Associations representing each of the breeds. It is also a fact that large numbers of so-called pure-bred animals are being brought into Canada and

sold for any price that can be obtained for them. Such animals are often of low quality, and recorded in books that are not recognized, even in the country from which the animals come; but they are brought into this country as pure-bred, and sold as such.

It is, therefore, recommended that this Association should take action to impress on the Dominion Government the importance of changing the regulations affecting the importation of live stock; to provide that stock must first be recorded in our books of record for the breed to which the animals being imported belong, and, if brought in for sale, must be imported, and owned by a British subject residing in Canada before they are entitled to enter free of duty.

Financial Statement.

To the Thirty-first of January, 1907.

Receipts.		Expenditures.	
Cash on hand from previous year...	$127 95	Grants to Fairs	$215 00
Members' fees	303 00	Directors' fees and expenses	16 60
		Postage and stationery.....	1 50
		Printing.....	5 90
		Auditor	2 00
		Incidentals	1 52
Total.....	$430 95	Total.....	$242 52
		Balance on hand.....	188 43

Examined and found correct, this 1st of February, 1907.

(Signed) J. M. Duff, *Auditor*

All of which is respectfully submitted.

Signed on behalf of Executive,

Arthur Johnston,
Vice-President for Ontario.

A. P. Westervelt,
Secretary-Treasurer.

RESOLUTIONS.

After considerable discussion the following resolutions were passed:

Moved by R. J. Mackie and seconded, "That the Hereford and Aberdeen-Angus class at the Winter Fair be separated and that prizes be given to each individual class." Carried.

During the discussion of the clause on the Importation of Live Stock, W. G. Ellis, objected to the words, "registered in the Canadian National Records." He reminded the meeting that the Canadian Holstein men have not yet seen fit to come into the National Records scheme, but were incorporated under a Dominion Act antedating it by many years. The Holstein men, however, felt the need of the proposed regulation, and would welcome

it. He, therefore, moved an amendment that the wording be changed to read: "The term "pure-bred" as applied to cattle in Canada, should refer to cattle registered in record incorporated under a Dominion charter." J. G. CLARK, pointed out that we should stand by the National Records system, and not leave a loophole, thereby encouraging the formation of other independent records. The amendment was lost.

The clause was finally adopted, with an amendment that all the words be struck out after "belong" near the end of the second paragraph. It was also informally suggested that the desired regulation should except settlers' effects.

It was then moved and seconded, "That the report of the Executive as amended be adopted." Carried.

The Secretary explained that owing to a change in the Act the President and Vice-President would be elected by the Directors, and that they as in most other Associations would elect the Executive Committee.

Moved and seconded, "That the directors be authorized to make the changes in the Constitution of this Association necessary to conform with the changes in the Act." Carried.

OFFICERS FOR 1907.

President.....JOHN GARDHOUSE, Highfield.
Vice-President.....W. W. BALLANTYNE, Stratford.
Secretary-Treasurer.....A. P. WESTERVELT, Toronto.

Directors.

Shorthorns.....JOHN ISAAC, Markham; ARTHUR JOHNSTON, Greenwood.
Herefords.....R. J. MACKIE, Oshawa; ALFRED STONE, Guelph.
Aberdeen-Angus.....A. MCKINNON, Hillsburg; J. W. BURT, Coningsby,
Galloways.....LIEUT-COL. D. MCCRAE, Guelph; ROBT. SHAW. Brantford.
Ayrshires.....W. W. BALLANTYNE, Stratford; W. F. STEPHEN, Huntingdon, Que.
Holstein-Friesian.....G. W. CLEMONS, St. George; A. C. HALLMAN, Breslau.
General Director.....JOHN GARDHOUSE, Highfield.
Ontario Agricultural College.....PRESIDENT G. C. CREELMAN; PROF. G. E. DAY.
Live Stock Commissioner.....DR. J. G. RUTHERFORD.

Executive Committee.

JOHN GARDHOUSE, Highfield.
W. W. BALLANTYNE, Stratford.
A. P. WESTERVELT, Toronto.
J. W. BURT, Coningsby.
LIEUT.-COL. D. MCCRAE, Guelph.

Delegates to Fair Boards.

Toronto: JOHN GARDHOUSE, Highfield.
Ottawa: PETER CHRISTIE, M.P., Manchester; ROBERT NESS, Howick, Que.
London: CAPT. T. E. ROBSON, London; A. W. SMITH, Maple Lodge.
Provincial Winter Fair: W. W. BALLANTYNE, Stratford; J. T. GIBSON, Denfield; JOHN BRIGHT, Myrtle.
Eastern Ontario Live Stock and Poultry Show: J. H. GRISDALE, Ottawa; N. F. WILSON M.P., Cumberland; JOHN GARDHOUSE, Highfield.
Auditor: J. M. DUFF, Guelph.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, on February the 23rd, 1907, at 9 a.m. On motion, Lieut. Col. McCrae, was appointed Chairman.

Moved by John Gardhouse, seconded by W. W. Ballantyne, "That clauses 9 and 15 of our Constitution be amended to conform to the new regulations of the Act respecting Agricultural Societies, viz., after the sixth word in first line of clause 9 strike out the words "the President, Vice-President;" clause 15 shall be added to by these words "At the first meeting of the Board of Directors following each annual meeting, a President and a Vice-President shall be elected." Carried.

Moved by R. J. Mackie, seconded by Robert Shaw, "That this Association make application for affiliation with the Canadian National Live Stock Association." Carried.

The meeting then adjourned.

(A list of members of the Dominion Cattle Breeders' Association is published in the appendix to this Report.)

DOMINION SHEEP BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, on February 5th, 1907, at 3 o'clock p. m. The President, J. M. Gardhouse occupied the chair.

As the minutes of the last meeting had been published and distributed to members, they were on motion taken as read.

PRESIDENT'S ADDRESS.

I wish to thank you for the honor you conferred upon me, in appointing me to this position a year ago. It will not be necessary for me to say much in regard to the sheep industry. The increased prices for wool and mutton during the past year have caused a great demand for sheep in the United States, and I do not think there is any better business, or any more paying business, than the raising of sheep. It might be well for me to say at least a word or two as to the success of our Canadian breeders at the shows in this country and also the great International Show at Chicago. You will agree with me that Canadians, as sheep breeders and sheep exhibitors, are second to none in the world. They certainly demonstrated that at the Chicago Show. I will not take up any more of your time, but will at once proceed with the business of the meeting.

REPORT OF THE EXECUTIVE.

The Executive submitted the following report:

Canadian National Sheep Records. During the year of 1906, on account of the Sheep Records which have been established, the membership of the Association has been increased as well as the general receipts. Following the report of the Executive last year, a Committee was appointed by the Dominion Department of Agriculture, consisting of the following: F. W. Hodson, Ottawa; Hon. N. Garneau, Quebec; Hon. John Dryden, Toronto; Robert Miller, Stouffville; John A. McGillivray, Toronto; A. W. Smith, Maple Lodge.

This committee was appointed to take up, through the Record Committee, some plan of international records with representatives of the American Associations. This Committee met with the representatives of the American Shropshire Registry Association at Buffalo, on March 17th, 1906, and the following agreement was entered into:

Agreement between the National Record Board of Canada and the American Shropshire Registry Association:

1. All pedigrees received by the Canadian office shall be transferred to the Registry office of the American Association for registration.

2. The owners of the Canadian sheep, registered under this agreement in the United States Records, shall be members of the American Association where said record is made, or shall pay the additional fee charged for registration to non-members.

3. All pedigrees transferred from the Canadian office to the American Association shall be fully prepared for the printers before transmission.

4. For each pedigree transmitted from the Canadian office for publication in the American Records, there shall be paid to the American registry office 30 cents per pedigree for all certificates issued to members of the Association, and for certificates issued to non-members, 80 cents shall be so paid.

5. Registration numbers for Canadian certificates shall be allotted (in block) by the American Secretary; when these are used an additional block of numbers shall be furnished.

6. A representative, approved of by the American secretaries, shall be placed in the Canadian office, who shall be authorized by power of attorney to sign the certificates of registration; such officer to be paid by the Canadian authorities.

After trying a number of times to make arrangements to meet with the representatives of the other American Record Associations, and being unable to do so, it was decided by the Committee to arrange for records for the other breeds entirely independent of the American records. Records have now been established for the following breeds: Cotswolds, Leicesters, Lincolns, Shropshires, Southdown, Dorset Horns, Oxfords and Hampshires.

The following is a statement of registrations for sheep up to December 31st, 1906.

	Registrations.	Transfers.	Ancestors.	Membership.	Refunds.
To 1st May	....	4	....	.....	.....
May	7	....	....	.....	$1 50
October	....	2	...	$4 00	.....
November	150	13	566	14 00	2 50
December	167	81	391	23 00	3 60
	324	100	957	$41 00	$7 60

The registrations, according to provinces, are as follows:

	Registrations.	Transfers.	Ancestors.
Ontario	100	35	183
British Columbia	....	1	4
Quebec	219	61	770
United States	5	3	....
	324	100	957

The monthly receipts on account of the Sheep Records at Ottawa (including memberships) are as follows:

To 31st December, 1905	$17 75
January to 30th April	7 50
May	7 00
July	7 00
August	34 60
September	89 25
October	25 00
November	171 25
December	108 65
	$468 00

Provincial Sheep Associations. In the last annual report the request was made in the form of a resolution passed by the Quebec Breeders' Association that any money received from the Province of Quebec for memberships should be retained by the Provincial Sheep Breeders' Association of Quebec, which Association had previously had charge of the Sheep Records in Quebec.

As National Sheep Records are now organized, some arrangement should be made regarding the distribution of the profits among all the Provinces interested, as well as the Province of Quebec. The following is suggested as a general plan to be adopted:

That the membership fees received from the members residing in each province should be returned to the Provincial Association looking after the sheep interests in that province every three months. This will enable the Provincial Associations to retain their membership and present organization without requiring an additional membership fee. At the end of the year, after deducting the general expenses of the Dominion Association, the profits from registration fees should be equitably divided among the Provincial Associations. In the case of any Province, where there is no Association to look after the interest of sheep, it is recommended that the profits accruing should be spent in the interest of the sheep industry in that Province in such manner as may be decided annually by the Dominion Sheep Breeders' Association, until a Provincial Association is formed.

Public Auction Sales of Pure-bred Sheep. At the last annual meeting the question of holding sheep sales was left with the Executive to deal with. A meeting of the Executive was called on June 8th, 1906, to consider the advisability of holding an auction sale of pure-bred sheep, and the following is the report of the meeting:

After considering the matter it was decided: (1) That if a sale were to be held nothing should be offered but first-class animals. (2) That on account of the demand for pure-bred sheep having been so keen during the past few months it was not considered probable that the kind of sheep required for a public auction sale would be held by the breeders for this purpose. (3) It was therefore decided that it was not wise to attempt to hold an auction sale of pure-bred sheep during the present year.

Winter Fair. At the last annual meeting of the Sheep Breeders' Association it was suggested that there be two classes for grade sheep at the Winter Fair, one for long-wool wethers and one for short-wool wethers; also that there should be a championship prize for wethers in all classes.

The Executive is glad to be able to report that arrangements were made to have these changes made in the classification of the prize list.

The following statement shows the number of entries in the classes for sheep at the Winter Fair at Guelph, 1906, together with the prize money offered in each class, and the amount paid:

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Cotswolds	30	$131 00	$129 00
Lincolns	23	131 00	129 00
Leicesters	43	156 00	151 00
Oxfords	28	186 00	155 00
Shropshires	34	231 00	231 00
Southdowns	41	206 00	206 00
Dorset Horns	23	104 00	102 00
Hampshires and Suffolks	10	86 00	72 00
Grades or Crosses	53	152 00	152 00
	285	$1,383 00	$1,327 00

Eastern Ontario Live Stock and Poultry Show. The following statement shows the number of entries in the classes for sheep at the Eastern Ontario Live Stock and Poultry Show in 1906, the amount of prize money offered and the amount paid.

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Cotswolds	12	$89 00	$66 00
Lincolns	15	89 00	71 00
Leicesters	12	89 00	84 00
Oxfords	6	89 00	35 00
Shropshires	..	89 00	.....
Southdowns	10	89 00	68 00
Dorset Horns	11	74 00	48 00
Hampshires and Suffolks	13	74 00	66 00
Grades and Crosses	15	78 00	74 00
	94	$760 00	$512 00

Protection of Sheep and Taxing of Dogs. Printed herewith are "Extracts from the Act for the Protection of Sheep and to impose a Tax on Dogs," as it is now in force in Ontario. The extracts given contain all those parts of the Act directly affecting persons interested in sheep or dogs, the omitted parts being repetitions and directions concerning legal and other proceedings. Your Executive has given the Act careful consideration, and suggests a number of changes to make the Act more effective. Parts that it is considered advisable to strike out are printed in *italics* and suggested additions are printed in **black-face** type. Members are asked to give these suggestions careful consideration.

(1) *Subject to the provision in the next section*, there shall be levied annually, upon the owner, possessor or harborer of each dog, an annual tax of $1 for *a* **one** *dog,* **$2 for each dog more than one,** and *$2* **($5)** for a bitch, provided, nevertheless, that the owner or possessor of a kennel of pure-bred dogs which are registered in the "Canadian Kennel Register" may pay to the treasurer of the municipality the sum of $10 as a tax upon such kennel for the year.

(2) *Upon the petition of twenty-five ratepayers the council of any city, town, township, or incorporated village may provide by by-law that the said tax or any part of it shall not be levied in said municipality.*

(3) The assessors of every municipality *within which a by-law has not been passed as provided in the preceding section* shall at the time of making their annual assessment, enter on the assessment roll in a column prepared for the purpose, opposite the name of every person assessed, and also opposite the name of every resident inhabitant not otherwise assessed, being the owner or keeper of any dog, the number **and sex of dogs** by him owned or kept.

(4) The owner, possessor or keeper of any dog shall *when* (be) required by the assessors **to** deliver to them, in writing, a statement of the number of dogs owned or kept by him, whether one or more; and for every refusal or neglect to do so, and for every false statement made in respect thereof, he shall incur a penalty of $5 to be recovered with costs, before any Justice of the Peace having jurisdiction in the municipality.

(5) In cases where persons have been assessed for dogs, and the collector has failed to collect the taxes authorized by this Act, he shall report the same under oath to any Justice of the Peace, and such Justice shall require such dogs to be destroyed by the possessors thereof, or by a constable, and for the purpose of so doing any constable may enter on the premises and destroy such dogs.

(6) The money collected and paid to the clerk or treasurer of any municipality under the preceding sections, shall constitute a fund for satisfying such damages, as arise in any year from dogs killing or injuring sheep or lambs in such municipality; and the residue, if any, shall form part of the assets of the municipality for the general purposes thereof; but when it becomes necessary in any year for the purpose of paying charges on the same, the fund shall be supplemented to the extent of the amount which has been applied to the general purposes of the municipality.

(7) *In case the council of any city, town, township or incorporated village, deems it advisable that the tax by this Act established should be maintained, but that the application of the proceeds should be dispensed with, it shall be lawful for such council by by-law to declare that such application shall be dispensed with; and thereafter during the continuance of such by-law the clauses of this Extract numbered 5, 6, and 13 to 19 inclusive shall have no force in the municipality.*

(8) Any person may kill

(*a*) Any dog which he sees pursuing, worrying or wounding any sheep; or

(*b*) Any dog without lawful permission in any enclosed field or farm which the owner or occupant thereof or his servant finds giving tongue and terrifying any sheep, or

(*c*) Any dog which any person finds straying between sunset and sunrise on any farm whereon any sheep are kept;

But no dog so straying which is kept by the occupant of any premises next adjoining the said farm, or next adjoining that part of any highway or lane which abuts on said farm, nor any dog either when securely muzzled, or when accompanied by or being within reasonable call of any person having the charge of said dog, shall be so killed unless there is reasonable apprehension that such dog if not killed is likely to pursue, worry, wound or terrify sheep then on the said farm.

(9) On a complaint made before a Justice of the Peace that any person owns, or has in his possession, a dog which has within six months previous worried or injured or destroyed any sheep the Justice may require such person to appear before him to answer to such a complaint.

(10) In case any person is convicted of having in his possession a dog which has worried or injured or destroyed any sheep, the Justice *may* (**shall**) make an order for the killing of such dog within three days, and in default thereof *may* (**shall**) impose a fine upon such person not exceeding $20 with costs.

(11) The owner of any sheep killed or injured by any dog shall be entitled to recover the damage from the owner or keeper of such dog, by an action before a Justice of the Peace, and such aggrieved party shall be entitled so to recover in such action whether the owner or keeper of such dog knew or did not know that it was vicious or accustomed to worry sheep.

(12) The keeper of any dog to whom notice is given of any injury done by his dog, shall within forty-eight hours after such notice cause such dog to be killed, and for every neglect so to do he shall forfeit a sum of $2.50 and a further sum of $1.25 for every forty-eight hours thereafter until the same is killed if it is proved that such dog has worried or otherwise injured such sheep; but no such penalties shall be enforced in case it appears that it was not in the power of the owner or keeper to kill such dog.

(13) In case the owner of any sheep so killed or injured proceeds against the owner or keeper of the dog that committed the injury, and is unable on the conviction of the offender to levy the amount ordered to be paid, then

the council of the municipality shall order their treasurer to pay to the aggrieved party two-thirds of the amount ordered to be paid by the Justice under the conviction in addition to the costs of the proceedings.

(14) The council of each township, town or village, shall at their first meeting each year appoint a competent person, to be known as the Sheep Inspector, whose duty it shall be to inspect the injury done to sheep by dogs in cases where the owner or keeper of the dog or dogs committing the injury cannot be found, and the aggrieved party intends to make claim for compensation from the council of the municipality. Said appointee shall investigate the injury within 48 hours after notice is given to him and forthwith make his report in writing to the Clerk of the Council as early as possible after the investigation, giving in detail the extent of injuries and amount of damage done. This report shall be used by the council as evidence in adjusting the claim.

(15) Subject to the provision in the next following section, the owner of any sheep killed or injured by any dog, the owner or keeper of which is not known, may within three months apply to the council for compensation for the injury; and if the council is satisfied that the aggrieved party has made diligent search and inquiry to ascertain the owner or keeper of such dog, and that such owner or keeper cannot be found, they shall award to the aggrieved party a sum not exceeding two-thirds of the amount of the damage sustained by him.

(16). The owner of any sheep or lamb killed or injured who intends to claim compensation from the council of the municipality shall notify the Sheep Inspector in person, or in writing, within 48 hours after the injury is committed.

(17) After the owner of such sheep has received from the municipality any money under either of the preceding sections, his claim shall thenceforth belong to the municipality, but in case the municipality recovers from the offender more than they had paid, besides their costs, they shall pay over the excess to the aggrieved party.

(18) The owner of any sheep killed or injured while running at large upon any highway or unenclosed land shall have no claim under this Act to obtain compensation from any municipality.

(19) *If the council of any city, town, township or incorporated village by by-law decided to dispense with the levy of the aforesaid tax, the owner of any sheep may, notwithstanding, sue the owner or keeper of any dog for the damage done.*

Importation of Live Stock. A great deal of live stock is being imported into Canada free of duty which is not recorded in any of the Canadian books of record for the various breeds. The result is that some of the owners afterwards record the animals here, but others continue to record them in foreign records. The term "pure-bred," as applied to live stock in Canada, should refer to live stock registered in the Canadian National Records. We now have a complete system of National Records for different breeds of live stock, the standard for which is as high as that of any Records in the world. They are authorized by the Government of Canada, and are conducted by the associations representing each of the breeds. It is also a fact that large numbers of so-called pure-bred animals are being brought into Canada and sold for any price that can be obtained for them. Such animals are often of low quality, and recorded in books that are not recognized even in the country from which the animals come, but they are brought into this country as pure-bred and sold as pure-bred.

It is, therefore, recommended that this Association should take action to impress on the Dominion Government the importance of changing the regulations affecting the importation of live stock, to provide that stock must first be recorded in our books of record for the breed to which the animals being imported belong, and if brought in for sale must be owned and imported by a British subject residing in Canada before they are entitled to enter free of duty.

Financial Statement.

To 31st January, 1907.

Receipts.		Expenditures.	
Cash on hand from previous year, as per last report	$67 16	Directors' fees and expenses	$35 21
Membership fees	169 00	Printing	6 90
Registration fees	427 00	Delegates to Fair Boards	14 15
		Refund of Record fees	5 00
		Quebec Association, on account of memberships	53 00
		Auditor	2 00
		Incidentals	1 02
		Balance on hand	545 88
Total	$663 16	Total	$663 16

Examined and found correct this 1st day of February, 1907.
(Signed) J. M. Duff, Auditor.

All of which is respectfully submitted,
J. M. Gardhouse, President. John Campbell, Vice-President. A. P. Westervelt, Sec.-Treas.

RESOLUTIONS.

The report of the Executive was then taken up clause by clause, and after considerable discussion regarding that part of the report referring to the establishment of Sheep Records the various clauses were adopted up to that referring to the "Protection of Sheep and Taxing of Dogs."

It was decided that section 13 of this clause should read as follows: In case the owner of any sheep so killed or injured proceeds against the owner or keeper of the dog that committed the injury, and is unable on the conviction of the offender to levy the amount ordered to be paid, then the council of the municipality shall order their treasurer to pay the aggrieved party, *not less than* two-thirds of the amount ordered to be paid by the Justice under the conviction in addition to the costs of the proceedings.

In section 15, seventh line, the words "not exceeding" were changed to read "not less than."

Moved by John Campbell, seconded by R. H. Harding.—"That the changes suggested in the Act "for the protection of sheep and to impose a tax on dogs" be adopted with the amendments made, and that the Legislature be asked to consider the changing of the Act at the earliest possible moment." Carried.

The clause on "Importation of Live Stock" was then considered, and it was moved by Col. McEwen, seconded by Mr. Pettit.—"That the matter

be referred to the Executive and that they take the matter up with Dr. Rutherford." Carried.

The financial statement was then read, and on motion was adopted.

Moved by D. G. Hanmer, seconded by John Jackson,—"That the directors be instructed to make the suggested changes in the constitution and by-laws so as to correspond with the changes in the Ontario Act of incorporation for the appointment of President and Vice-President." Carried.

Mr. Lloyd-Jones took up the subject of duty on wool and sheep, making a motion asking the Government that the duty on wool be put at 10 cents a pound, and the duty on lambs $1 a head. Objection was taken to this Breeders' Association dealing with a commercial question of the kind, and the subject was referred back to the committee appointed last year.

Mr. Andrew Whitelaw, representing the Leicester Breeders' Association, brought up a resolution passed by that association at Guelph, protesting against the fifteen days quarantining of imported sheep. In reply, Dr. Rutherford pointed out that the fifteen days after disembarkation was only part of a nominal 30-days quarantine, commencing at the time the sheep cleared from the port of departure. This is necessary for two reasons. In the first place our quarantine regulations accord with those of the United States, and any slackening of the precautions on our part would probably result in the inauguration of a quarantine system along the international boundary. In the second place, thirty days' quarantine is necessary as a safe-guard against the introduction of foot-and-mouth disease from the Old Country.

In connection with this matter, Arthur Johnston said that in 1875 he brought out foot-and-mouth disease, and in six weeks it had extended to St. Louis.

Moved by R. H. Harding, seconded by John Jackson, "That a committee be appointed, consisting of the mover, Col. McEwen, John Campbell and the Secretary, to lay before the management of the International Live Stock Exposition the necessity for better Customs Regulations being given to Canadian exhibitors at the International Show at Chicago, and that full particulars be placed in the hands of Dr. Rutherford " Carried.

OFFICERS FOR 1907.

President	John Campbell, Woodville.
Vice-President	Andrew Whitelaw, Guelph.
Secretary-Treasurer	A. P. Westervelt. Toronto.

Directors.

Cotswolds	Lt. Col. D. McCrae, Guelph.
Leicesters	Andrew Whitelaw, Guelph.
Hampshires and Suffolks	John Kelly, Shakespeare.
Southdowns	John Jackson, Abingdon.
Dorsets	R. H. Harding, Thorndale.
Lincolns	J. T. Gibson, Denfield.
Oxfords	T. R. Arkell, Arkell.
Shropshires	Wm. A. Dryden, Brooklin.
Ontario Agricultural College	Prof. G. E. Day, Guelph.

General Directors..... J. M. Gardhouse, Weston.
John Campbell, Woodville.
A. W. Smith, Maple Lodge.
Auditor.....J. M. Duff, Guelph.

Representatives to Record Board.

J. M. Gardhouse, Weston. R. H. Harding, Thorndale.

Delegates to Fair Boards.

Canadian National: Hon. John Dryden, Toronto; John Jackson, Abingdon.

Central Canada: N. F. Wilson, Cumberland.

Western Fair, London: Lt. Col. R. McEwen, Byron; Geo. Telfer, Paris.

Provincial Winter Fair: A. W. Smith, Maple Lodge; John Jackson, Abingdon: Lt. Col. R. McEwen, Byron.

Eastern Ontario Live Stock and Poultry Show: John Campbell, Woodville: W. A. Wallace, Kars; R. Richardson, South March.

Winnipeg Industrial: F. W. Brown, Portage la Prairie, Man.; Geo. Allison, Burbank, Man.

EXPERT JUDGES FOR SHEEP FOR 1907.

Cotswolds: T. Hardy Shore, Glanworth; R. Miller, Stouffville: S. J. Lyons, Norval; Val. Fitcht, Oriel; Jas. Underhill, Claremont; F. Bonnycastle, Campbellford; Prof. G. E. Day, Guelph; Geo. Green, Fairview; J. C. Snell, London; John Rawlings, Ravenswood; Wm. Thompson, Uxbridge; John Park, Burgessville.

Toronto: T. Hardy Shore, Glanworth; Val. Fitcht, Oriel.

London: S. J. Lyons, Norval; Val. Fitcht, Oriel.

Ottawa: Jas. Underhill, Claremont; F, Bonnycastle, Campbellford.

Chicago: Prof. G. E. Day, Guelph; Robert Miller, Stouffville.

Leicesters: R. J. Garbutt, Belleville; Jas. Fennell, Bradford; H. B. Jeffs, Bond Head; A. E. Archer, Warwick; Geo. Whitelaw, Guelph; T. Hardy Shore, Glanworth; Abraham Easton, Appleby: E. Wood, Appleby: Wm. Parkinson, Eramosa; E. Parkinson, Eramosa; John Orr, Galt; Wm. McIntosh, Burgoyne; R. Eastwood, Mimico; John Kelly, Shakespeare: Andrew Thompson, Fergus; J. K. Campbell, Palmerston; J. C. Snell, London; G. B. Armstrong, Teeswater; John Gibson, Denfield: C. E. Wood, Freeman; Jos. Gaunt, St. Helen's; J. M. Gardhouse, Weston: And. Whitelaw, Guelph; Wm. Whitelaw, Guelph; R. G. Martin, Marysville: A. W. Smith, Maple Lodge: H. G. Arnold, Maidstone: Prof. Craig, Ames, Ia.: John Marshall, Cass City, Mich.; J. W. Murphy, Cass City, Mich.: Prof. Curtis, Ames, Ia.; Geo. Penhale, Exeter: Prof. G. E. Day, Guelph: M. Kennedy, Northwood; D. Lillico, Ayr: Jas. Douglass, Caledonia: Frank Shore, White Oak; John Gardhouse, Highfield: Wm. Beattie, Wilton Grove; A. J. McKay, Ailsa Craig; A. Hastings, Crosshill; J. Hastings, Crosshill: A. Deering, Crosshill.

Toronto: Robert Garbutt, Belleville; (Reserve) Jas. Douglas, Caledonia.
London: J. M. Gardhouse, Weston.
Ottawa: Wm. Whitelaw, Guelph.

Dorsets: John Kelly, Shakespeare; Robert Miller, Stouffville; J. M. Gardhouse, Weston; John Campbell, Woodville; J. G. Hanmer, Brantford; Prof. Curtis, Ames, Ia.; Thos. W. Hector, Springfield-on-Credit; G. P. Everett, Mt. Vernon; H. N. Gibson, Delaware; E. O. Denton, Somerset; N.Y.; G. McKerrow, Sussex, Wis.; John Jackson, Abingdon; Fred Silversides, Uxbridge; R. H. Harding, Thorndale.
Toronto: John Campbell, Woodville; A. S. Forster, Oakville.
London: J. G. Hanmer, Brantford; (Reserve) J. M. Gardhouse, Weston.

Southdowns: John Jackson, Abingdon; W. H. Beattie, Wilton Grove; W. H. Gibson, Beaconsfield, Que.; N. H. Gibson, Delaware; Robert Miller, Stouffville; Geo. Telfer, Paris; J. G. Hanmer, Brantford; J. C. Duncan, Orchard Park, N.Y.; Robert McEwen, Byron; H. L. Compton, Monroe, Ohio; Frank Klienhientz, Madison, Wis.; Prof. G. E. Day, Guelph; James Telfer, Paris; George Allen, Paris; Fred Fawkes, Beaconsfield, Que.; Sam. Bradburne, Simcoe.

Oxfords: Prof. G. E. Day, Guelph; John Harcourt, St. Ann's; Smith Evans, Guelph; Jas. Tolton, Walkerton; R. J. Hine, Dutton; Henry Arkell, Arkell; Wm. Dickson, Mildmay; J. H. Jull, Mt. Vernon; W. J. Arkell, Teeswater; John E. Cousins, Harriston; Arch. McKenzie, Corwhin; R. E. Birdsall, Birdsall; J. C. Cooper, Picton; Wm. Newman, Cherry Valley; Wm. Arkell, Teeswater; L. Parkinson, Eramosa; S. C. Ketchen, Bloomburg; W. Lee, Simcoe; Prof. M. Cumming, Truro, N.S.; Walter Elliott, Kelso.

Hampshires and Suffolks: R. Gibson, Delaware; Henry Arkell, Arkell; W. H. Beattie, Wilton Grove; James Bowman, Guelph; John Kelly, Sharespeare; Geo. L. Telfer, Paris; Prof. G. E. Day, Guelph; H. N. Gibson, Delaware; W. H. Arkell, Guelph; W. R. Bowman, Mt. Forest; John Campbell, Woodville; R. J. Stone, Stonington, Ill.; J. Milton, Marshall, Mich.; Harry Thornton, Warren, Ind.; Frank Klienhientz, Madison, Wis.
Toronto: H. S. Arkell, Guelph.
London: W. H. Beattie, Wilton Grove.
Ottawa: John Campbell, Woodville.

Lincolns: John Gardhouse, Highfield; Leonard Parkinson, Eramosa; Robert Robson, Ilderton; Joseph Patrick, Ilderton; E. Parkinson, Eramosa; Herbert Lee, Highgate; Hardy Shore, Glanworth; Prof. G. E. Day, Guelph; Andrew Whitelaw, Guelph; D. Campbell, Strathburn; John T. Gibson, Denfield.
Toronto: John Gardhouse, Highfield.
London: D. Campbell, Strathburn.
Ottawa: Leonard Parkinson, Eramosa.

Shropshires: W. H. Beattie, Wilton Grove; R. Miller, Stouffville; J. G. Hanmer, Brantford; J. Campbell, Woodville; D. G. Hanmer, Burford; W. G. Pettit, Freeman; D. J. Campbell, Woodville; H. N. Gibson, Millbrook, N.Y.; Geo. Hindmarsh, Ailsa Craig; C. W. Gurney, Paris;

J. Miller, Brougham; H. Hanmer, Burford; J. C. Duncan, Orchard Park, N.Y.; Prof. G. E. Day, Guelph; Arthur Barnett, Brooklin; J. Shields, Caistorville; Geo. Crawford, Minesing; John Jones, Burford; W. D. Monkman, Bond Head; Will Dryden, Brooklin.

Toronto: H. S. Arkell, Guelph. (Reserve.) H. N. Gibson, Millbrook, N.Y. (Reserve.) W. H. Beattie, Wilton Grove.

London: W. G. Pettit, Freeman. (Reserve.) H. S. Arkell, Guelph.

Ottawa: D. G. Hanmer, Burford.

Provincial Winter Fair: J. C. Duncan, Orchard Park, N.Y. (Reserve.) J. G. Hanmer, Brantford.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, on February the 23rd, 1907, at 10.30 a.m. The President, J. M. Gardhouse, occupied the chair.

Moved by Col. McCrae, and seconded by John Kelly, "That clauses 2, 9 and 15 of our Constitution be amended to conform to the new regulations of the Act respecting Agricultural societies, viz., after the second word in the third line of clause 2 add "and three general directors;" after the sixth word in the first line of clause 9 strike out the words "President, Vice-President and:" clause 15 shall be added to by these words "At the first meeting of the Board of Directors following each annual meeting, a President and a Vice-President shall be elected." Carried.

Moved by Col. McCrae, seconded by Mr. Harding, "That this Association affiliate with the National Live Stock Association." Carried.

The meeting then adjourned.

(A list of members of the Dominion Sheep Breeders' Association is published in the appendix to this Report.

DOMINION SWINE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Swine Breeders' Association was held at the Palmer House, Toronto, on February the 6th, 1907, at 9.30 a.m.

The President, R. H. HARDING, occupied the chair.

In the course of a few remarks, the President congratulated the members on the large representation present, and the healthy condition of the swine industry as hogs were selling around 7 cents per pound, and the market had been practically up to that mark the whole year round, which was very encouraging to the breeders of swine. He stated that what was a benefit to the bacon hog industry was also a benefit to the breeder of pure-bred hogs, and the outlook was certainly very bright for a good market for the coming year.

DIRECTORS' REPORT.

The secretary read the following report as submitted by the directors:

RECORDS. The number of registrations in 1906 is, at least, one-half larger than in 1905. The following is a general statement as to the registrations:

	Registrations.	Transfers.	Duplicate Certificates.	New Certificates.	Ancestors.	For Books Sold.	Membership.	Refunds.
January	253	35	..	..	....	.....	$84 00	$ 2 00
February	452	44	..	..	....	. ..	78 00	.....
March	507	92	..	..	....	.....	122 00	30 15
April	303	54	..	..	....	$2 75	.....	.....
May	472	31	6	..	58	.....	58 00	3 50
June	514	33	2	..	66	.....	58 00	2 85
July	657	22	4	3	93	.....	56 00	17 25
August	690	55	4	..	71	.....	64 00	18 50
September	692	39	3	..	117	.....	70 00	29 75
October	599	22	14	2	9	.....	14 00	3 00
November	559	49	5	..	....	.....	42 00	8 15
December	517	57	1	..	8	.....	46 00	4 50
	6,215	533	39	5	422	$2 75	$692 00	$119 65

The statement of registration according to the Provinces is as follows:

Province.	Registrations.	Transfers.	Duplicate Certificates.	New Certificates.	Ancestors.
Ontario	3,933	320	26	2	5
Manitoba	654	89	3	..	..
Saskatchewan	165	13	1	..	6
Alberta	147	9	4	..	..
British Columbia	88	20	1	..	..
Quebec	1,030	75	2	..	399
New Brunswick	99	1	2	..	12
Nova Scotia	26	1	..	3	..
Prince Edward Island	50	5	..	..	..
United States	23	..	..	..	..
	6,215	533	39	5	422

The number of pedigrees for the different breeds to be published in Volume 17 of the Record is as follows:

Berkshires	2,176	Poland Chinas	80
Yorkshires	3,574	Duroc Jerseys	23
Chester Whites	683	Tamworths	535

The monthly receipts on account of the swine records at Ottawa are as follows:

To December 31st, 1905	$1,903 30	Forward	$3,878 05
January, 1906	302 40	July, 1906	434 05
February, 1906	347 80	August, 1906	479 75
March, 1906	364 80	September, 1906	471 50
April, 1906	240 75	October, 1906	398 95
May, 1906	338 00	November, 1906	380 90
June, 1906	381 00	December, 1906	353 30
			$6,396 50
Forward	$3,878 05		

Swine Memberships. In the last annual report of the Directors there was printed a copy of a resolution passed at a meeting of the General Breeders' Association of Quebec, asking that the membership fees of the Dominion Swine Breeders' Association, from swine breeders in Quebec, should remain the property of the Quebec Association, and that the net profits from registering swine from the Province of Quebec be annually returned to the said Provincial Association.

The Executive of the Dominion Swine Breeders' Association, to whom the matter was referred, made the following recommendation, which was approved by the Directors:

"In the Provinces in which there is an Association to look after the swine interests of that Province, the membership to the Dominion Swine Breeders' Association should be paid to the Secretary of that Association, either directly or through the Secretary of the Provincial Association, and that every three months the membership fees should be returned to these Provincial Associations; and at the end of each year, after deducting general expenses, including copy of printed volume of the Record, the profits should be equitably divided among the Provincial Associations. In the case of Provinces in which there is no Association to look after the interests of swine, the profits accruing from the registrations and memberships will be spent in the interest of the swine industry in these Provinces, as may be decided annually until a Provincial Association is formed."

Division of Surplus Money. At the last Annual Meeting it was ordered that $2,000 of the surplus fund then on hand should be distributed to the various Provinces, as follows:

Ontario	$1,400 00	Nova Scotia	$15 00
Quebec	140 00	New Brunswick	20 00
Manitoba	285 00	Prince Edward Island	20 00
British Columbia	40 00	North-West Territories	80 00

Of the $1,400.00 to Ontario, $500.00 was held back for future distribution, and the balance was voted as follows:

Provincial Winter Fair	$200 00
Canadian National Exhibition	300 00
Western Fair, London	150 00
Central Canada Exhibition, Ottawa	150 00
Eastern Ontario Live Stock and Poultry Show	100 00
	$900 00

The grants to Associations in Provinces, other than Ontario, were paid as follows:

F. M. Logan, Sec. Stock Breeders' Association, Victoria, B.C.	$40 00
C. W. Peterson, Sec. Stock Breeders' Association, Calgary, Alta.	40 00
G. W. G. Wright, Sec. Stock Breeders' Association, Regina, Sask	40 00
G. H. Greig, Sec. Sheep and Swine Breeders' Association, Winnipeg, Man	285 00
E. B. Elderkin, President Stock Breeders' Association, Amherst, N.S.	55 00

In accordance with the decision regarding the distribution of memberships and the profits from registrations, the payments to the various Provinces for 1906 would be as follows:

Province.	No. of Members.	No. of Registrations.	Amount of Membership.	Profits from Registrations.	Total Refund.
Ontario	240	3,933	$480 00	$1,076 22	*$1,556 22
Quebec	90	1,030	180 00	281 84	*461 84
Maritime Provinces	14	175	28 00	47 89	75 89
Manitoba	66	654	132 00	178 96	310 96
Saskatchewan	25	165	50 00	45 15	95 15
Alberta	12	147	24 00	40 22	64 22
British Columbia	10	88	20 00	24 09	44 09

It is recommended that before the profits accruing to each provincial association is paid, a report as to how the funds for the previous year have been expended by the provincial association should be supplied this Association, and it is further recommended that the profits from the Ontario work, $1,556.22, should be spent as follows:

(1) That the Ontario Yorkshire Breeders' Society should be paid the profits from the Ontario Yorkshire registrations, amounting to $750.

(2) That the balance of the profits for Ontario should be paid in grants to Fair Associations as follows:

(*a*) The Provincial Winter Fair	$200 00
(*b*) The Canadian National Exhibition	250 00
(*c*) The Western Fair, London	100 00
(*d*) Eastern Ontario Live Stock and Poultry Show	100 00

Provided that these Fair Associations contribute towards the prizes for swine at least as much as was contributed in 1906.

(3) To the Central Canada Exhibition, Ottawa, $250, made up of $150 offered in 1906 and $100 of the amount for distribution this year. Provided that Association makes the total classification for swine for 1907, including the Swine Breeders' Association grant, $1,017.

Provided further that the prizes for Yorkshire classess at these shows should not be increased out of these grants.

Ontario Provincial Winter Fair. The swine exhibit at the Winter Fair of 1906 was a very large one, there being fully one-third more entries than the year before. The following table shows the number of entries in 1906 in the different classes, together with the amount of prize money offered and won:

Class.	No. of Entries.	Prizes Offered.	Prizes Paid.
Berkshires	77	$159 00	$159 00
Yorkshires	56	159 00	159 00
Tamworths	42	159 00	159 00
Chester Whites	32	129 00	129 00
Grades and Crosses	44	120 00	120 00
Bacon Hogs	88	510 00	510 00

*In addition to these amounts, there is $650 for Ontario and $140 for Quebec, on account of the division of funds made last year.

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW.—The statement below shows the number of entries, the prizes offered, the prizes won in each class of swine at the Eastern Ontario Live Stock and Poultry Show of 1906.

Class.	No. of Entries.	Prizes Offered.	Prizes Won.
Berkshires	10	$80 00	$68 00
Yorkshires	23	80 00	80 00
Tamworths	17	80 00	80 00
Grades and Crosses	37	80 00	80 00
Bacon Hogs	51	370 00	370 00

FINANCIAL STATEMENT.

To the 31st January, 1907.

RECEIPTS.		EXPENDITURES.	
Cash on hand	$2,385 34	Grants to other societies, fairs	$1,095 00
Members' fees	914 00	Directors' fees and expenses	75 61
Overpaid to Record Board, 1905	171 72	Postage and stationery	1 00
Registration fees	3,740 55	Printing	1,000 22
Interest	39 30	Telegraph and telephone	1 92
Sale of Records	8 25	Delegates to Fair Boards	20 00
Miscellaneous	0 75	Refund of Record fees	143 43
		Fees to Quebec Association	60 00
		Levy of Record Committee	1,000 00
		Auditor	2 00
		Auditing Records	16 00
		Miscellaneous	6 02
		Total	$3,421 20
Total	$7,259 91	Balance on hand	$3,838 71

Examined and found correct,
this 1st day of February, 1907.

(Signed) J. M. DUFF, *Auditor.*

All of which is respectfully submitted.

R. H. HARDING, *President.* D. C. FLATT, *Vice-President.* A. P. WESTERVELT, *Sec.-Treasurer.*

RESOLUTIONS.

The report of the Directors was discussed and on motion of J. E. BRETHOUR, seconded by H. B. JEFFS, it was adopted.

Moved by H. B. JEFFS, seconded by WM. JONES, "That the question of changing the Constitution to comply with the new Ontario Act be left in the hands of the Directors, with power to make the suggested change." Carried.

Mr. BRETHOUR stated that after the change in the Constitution more directors would probably be required, and he thought it would be advisable to nominate two additional General Directors. R. H. Harding and D. C. Flatt were therefore nominated as General Directors.

Mr. DANIEL DECOURCEY suggested that a resolution be passed asking the Toronto Industrial for a larger grant towards the Swine class designated as "Other Distinct Breeds." He stated that at present the prizes were not large enough to induce breeders to bring out exhibits, and he for one would not exhibit if the prizes in this class were not increased.

Moved by GEORGE GREEN, seconded by W. H. DURHAM, "That this Association recommend to the Toronto Exhibition Association through the Secretary, as well as through their representatives, that the class for "Other Distinct Breeds" be placed on a par with the Berkshire and Yorkshire classes, as far as the prize list is concerned." Carried.

It was moved by THOS. TEASDALE, seconded by JOHN BOYES, Jr., "That this Association urgently recommend to the Toronto Industrial Fair Board that the judging of swine be commenced on Friday of the first week of the Fair." Carried.

Moved by HERBERT GERMAN, seconded by A. C. HALLMAN, "Whereas the Yorkshire and Tamworth hogs have been judged by the same judges at the Canadian National Fair, and that the Tamworths have not been judged until Wednesday of the second week, Resolved that the Tamworths be judged separately from the Yorkshires and by judges suggested by the Tamworth breeders and that they be judged the first week of the Fair, and that the Swine Breeders' representative be instructed to present this resolution to the Canadian National Fair Board." Carried.

J. E. BRETHOUR moved, seconded by WM. JONES, "That the Dominion Swine Breeders' Association affiliate with the National Live Stock Association, and that the Secretary be instructed to make application for affiliation." Carried.

OFFICERS FOR 1907.

President ..... R. H. HARDING, Thorndale.
Vice-President ..... D. C. FLATT, Millgrove.
Secretary-Treasurer ..... A. P. WESTERVELT, Toronto.
Registrar ..... J. W. NIMMO, Ottawa.

Directors.

Berkshires ..... W. H. DURHAM, Toronto.
Yorkshires ..... J. E. BRETHOUR, Burford.
Chester Whites ..... D. DECOURCEY, Bornholm.
Poland Chinas ..... WM. JONES, Zenda.
Duroc Jerseys ..... W. M. SMITH, Scotland.
Tamworths ..... J. C. SMITH, Hintonburg.
Essex ..... JOS. FEATHERSTON, Streetsville.
General Directors ..... D. C. FLATT, Millgrove.; R. H. HARDING, Thorndale.; THOS. TEASDALE, Concord.
Ontario Agricultural College ..... PROF. G. E. DAY, Guelph.
Dominion Live Stock Commissioner ..... DR. RUTHERFORD, Ottawa.
Auditor ..... J. M. DUFF, Guelph.

REPRESENTATIVES TO FAIR BOARDS.

Toronto Industrial: D. C. FLATT, Millgrove; Major G. B. HOOD, Guelph.
Ottawa: ROBERT CLARK, Ottawa; D. BARR, Jr., Renfrew.
London: GEO. GREEN, Fairview, D. DECOURCEY, Bornholm.
Peterborough: ROBERT VANCE, Ida.
Guelph: G. B. HOOD, Guelph.
Belleville: T. J. HURLEY, Jr., Belleville.
Kingston: R. J. GARBUTT, Belleville.

Provincial Winter Fair: Prof. G. E. Day, Guelph; G. B. Hood, Guelph; Wm. Jones, Zenda.

Winnipeg: And. Graham, Pomeroy, Man.; J. A. McGill, Neepawa, Man.

Eastern Ontario Live Stock and Poultry Show: R. H. Harding, Thorndale; P. O. Collins, Bowesville; J. C. Smith, Hintonburg.

EXPERT JUDGES FOR SWINE FOR 1907.

Berkshires: Wm. Wilson, Snelgrove; J. C. Smith, Hintonburg; X. Plaunt, Northcote; Samuel Dolson, Alloa; Hugh G. Clark, Georgetown; P. W. Boynton, Dollar; Alex. Smith, Maple Lodge; Wm. Jones, Zenda; W. G. Cavan, East Toronto; Jas. McEwen, Kertch; John Boyes, Jr., Churchill; Henry Jones, Zenda; H. J. Davis, Woodstock; J. C. Snell, London; Thos. Teasdale, Concord; Geo. Green, Fairview; Robert Vance, Ida; T. A. Cox, Brantford; Jas. Quirie, Delaware; Jos. Featherston, Streetsville; C. R. Decker, Chesterfield; Chas. Youngs, Brooksdale; D. DeCourcey, Bornholm; R. H. Harding, Thorndale; Jos. Barnett, Brooklin; E. E. Martin, Canning; H. B. Jeffs, Bond Head; Wm. Linton, Aurora; E. Brien, Ridgetown; G. B. Hood, Guelph; J. E. Brethour, Burford; Alex. Hart, Hampstead; W. A. Shields, Milton; D. J. Gibson, Bowmanville; S. J. Lyons, Norval; A. Johnston, Greenwood; C. C. McAvoy, Atha; J. L. Clark, Norval; Aiken Dolson, Alloa; John Watkins, Norval; D. C. Flatt, Millgrove; W. H. Durham, Toronto; Wm. Hartley, Alloa; John Bright, Myrtle; Frank Teasdale, Concord; Douglas Thomson, Woodstock; J. Weir, Northfield Centre.

Toronto: S. J. Lyons, Norval; E. E. Martin, Canning. (Reserve) Robert Vance, Ida.

London: Samuel Dolson, Alloa. (Reserve) T. A. Cox, Brantford.

Ottawa: T. A. Cox, Brantford. (Reserve) John Kelly, Shakespeare.

Guelph: W. G. Cavan, Toronto. (Reserve) H. G. Clark, Georgetown.

Yorkshires and Tamworths: David Barr, Jr., Renfrew; E. A. Kipp, Chilliwack, B.C.; Jas. Bray, Longburn, Man.; Lou Rogers, Weston; Geo. D. Betzner, Copetown; R. J. Kerr, Mimosa; W. R. Bowman, Mount Forest; Wm. Jones, Zenda; R. J. Garbutt, Belleville; R. H. Harding, Thorndale; N. M. Blain, St. George; J. H. Simonton, Chatham; G. North, Marden; A. Elliott, Galt; L. F. Master, Haysville; A. C. Hallman, Breslau; D. G. Hanmer, Burford; John Nichol, Hubrey; J. E. Brethour, Burford; A. Laurie, Wolverton; Wm. Davies, Toronto; Richard Gibson, Delaware; Henry Dedels, Kossuth; G. B. Hood, Guelph; F. Shore, White Oak; Jos. Featherston, Streetsville; H. E. Sharp, Ida; A. F. McGill, Hillsburg; J. M. Hurley, Belleville; Geo. Gier, Grand Valley; Jas. Stephen, Trout River, Que.; R. McCulloch, Harriston; Jos. Fletcher, Oxford Mills; Robert Nichol, Brussels; A. F. Foreman, Collingwood; Jas. Leach, Toronto; Wm. Howe, North Bruce; Prof. G. E. Day, Guelph; H. J. Davis, Woodstock; D. C. Flatt, Millgrove; W. R. McDonald, Ridgetown; W. Elliott, Galt; R. G. Martin, Marysville; J. E. Cousins, Harriston; Geo. Green, Fairview; J. W. Callbeck, Augustine Cove, P.E.I.; J. G. Clark, Ottawa; J. C. Smith, Hintonburg; D. Drummond, Ottawa; H. B. Jeffs, Bond Head; And. Graham, Pomeroy, Man.; A. Carey, Millgrove; Jas. Yule, East Selkirk; A. W. Ross, Bromley; J. J. Pearson, Cooksville;

R. F. Duck, Port Credit; Duncan Anderson, Rugby; Thos. Hurley, Belleville; J. H. Grisdale, Ottawa; A. A. Colwill, Newcastle; M. Cumming, Truro, N.S.; R. O. Morrow, Hilton; Geo. Douglas, Mitchell: Jas. Douglas, Mitchell; A. P. Ketchen, Regina, Sask.; W. A. Trann, Cedar Grove; P. O. Collins, Bowesville; L. Foster, Myrtle; J. G. Foster, Myrtle; J. R. Flatt, Millgrove; J. Duck, Port Credit; Ken. Featherston, Streetsville; W. J. Black, Winnipeg, Man.; A. B. Potter, Montgomery, Sask.; Herbert German, St. George; M. Wilson, Fergus; D. Currie, Morriston; Gus. A. Langelier, Quebec; Richard Birch, Anderson.

Toronto: Yorkshires—Wm. Jones, Zenda; R. J. Garbutt, Belleville. Tamworths—A. C. Nichol, Hubrey. Bacon Hogs—Wm. Jones, Zenda; R. J Garbutt, Belleville; A. C. Nichol, Hubrey.

London: A. C. Hallman, Breslau; (Reserve) G. B. Hood, Guelph.

Ottawa: D. C. Flatt, Millgrove.

Guelph: Wm. Jones, Zenda; A. C. Hallman, Breslau. Bacon Hogs—R. J. Garbutt, Belleville; Prof. G. E. Day, Guelph. (Reserve) Wm. Jones, Zenda.

Essex: H. G. Clark, Georgetown; G. B. Hood, Guelph; R. J. Garbutt, Belleville; R. H. Harding, Thorndale; Wm. Jones, Zenda; Jas. Main, Milton.

Duroc-Jerseys: D. C. Flatt, Millgrove; D. DeCourcey, Bornholm; G. B. Hood, Guelph; Geo. Green, Fairview; Wm. Jones, Zenda; J. E. Brethour, Burford; R. H. Harding, Thorndale; W. M. Smith, Scotland; Geo. Bennett, Charing Cross; Jos. Featherston, Streetsville; W. Wilson, Snelgrove; Prof. G. E. Day, Guelph; Jos. McGarvin, Chatham; W. N. Tape, Bentpath.

Poland Chinas: Jos. Featherston, Streetsville; D. DeCourcey, Bornholm; Geo. Green, Fairview; Wm. Jones, Zenda; W. M. Smith, Scotland; R. H. Harding, Thorndale; R. Willis, Glen Meyer; Prof. G. E. Day, Guelph.

Chester Whites: E. D. George, Putnam; R. E. Birdsall, Birdsall; Albert Barachy, Bloomington; Wm. Jones, Zenda; J. C. Snell, London; Geo. Green, Fairview; D. DeCourcey, Bornholm; R. H. Harding, Thorndale; G. B. Hood, Guelph; Gideon Snyder, Jarvis; Jos. Featherston, Streetsville; G. Bennett, Charing Cross; J. E. Brethour, Burford; J. C. Nichol, Hubrey; Prof. G. E. Day, Guelph; W. E. Wright, Glanworth; Robert Clark, Ottawa; D. C. Flatt, Millgrove; Geo. Douglas, Mitchell; J. C. Smith, Hintonburg; R. J. Garbutt, Belleville.

London: D. C. Flatt, Millgrove; G. E. Day, Guelph.

Toronto: If Chester Whites are shown by themselves, G. B. Hood, but if breeds are shown together R. J. Garbutt, Belleville.

Ottawa: Jos. Featherston, Streetsville; G. B. Hood, Guelph; J. E. Brethour, Burford.

Guelph: G. B. Hood, Guelph.

DIRECTORS' MEETING.

A meeting of the directors of the Dominion Swine Breeders' Association, was held at the Palmer House, Toronto, on Saturday, February the 23rd, at 1.30 p.m.

Following the instructions of the annual meeting of the Swine Breeders' Association, the following changes were suggested by the Secretary, in the Constitution, to comply with the revision of the Act under which the Association is incorporated:

1. That "and three general directors" should be added after "established breeds" in the third line of clause 2.

2. The following words should be taken out of clause 9. "President, Vice-President and."

3. That the following should be added to clause 15, "At the first meeting of the Board of Directors following each annual meeting, a President and Vice-President shall be elected."

It was moved by Prof. DAY, seconded by THOS. TEASDALE, "That clauses 2, 9 and 15 of our Constitution be amended to conform with the new regulations of the Act respecting Agricultural Societies." Carried.

It was moved by Prof. DAY, seconded by J. C. SMITH, "That the nominees of the annual meeting for general directors be confirmed." Carried.

Moved by Prof. DAY, seconded by WM. JONES, "That Jos. Featherston of Streetsville, and J. E. Brethour of Burford, be delegates to the National Record Board." Carried.

The meeting then adjourned.

(A list of members of Dominion Swine Breeders' Association is published in the appendix to this Report.

WESTERN ONTARIO POULTRY ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Western Ontario Poultry Association was held in the City Hall, Guelph, on Thursday, December 13th, 1906, at 1.30 p.m. The President, Wm. McNeil, in the chair.

It was moved and seconded that the minutes of the last meeting be taken as read. Carried.

The financial statement was read and on motion was accepted.

Moved by Wm. Barber, seconded by Mr. Spry, "That Mr. Westervelt, the Secretary, write to the Secretary of the Canadian National Exhibition to see if this Association can get an additional delegate on the Toronto Fair Board." Carried.

Several members spoke of the crowded condition of the poultry department which necessitated coops being placed where the light was not good.

OFFICERS FOR 1907.

Hon. President..... Dr. A. W. Bell, Winnipeg, Man.
President..... Wm. McNeil, London, Ont.
1st Vice-President..... Allan Bogue, Woodbank.
2nd Vice-President..... W. J. Bell, Angus.

Directors.

L. H. Baldwin, Deer Park.
A. W. Tyson, Guelph.
G. G. Henderson, Hamilton.
T. H. Scott, St. Thomas.
P. Grier, Owen Sound.
R. Oke, London.
N. K. Cornwall, Thamesville.
C. H. Wilson, Hawkestone.

Representatives to Canadian National Exhibition:
Wm. McNeil, London. Wm. Barber, (2nd representative if two can be secured).

Representatives to Western Fair, London:
J. H. Saunders, London. C. A. Stewart, London.

Representatives to Brantford:
J. H. Minshall, Brantford. Wm. Ferguson, Brantford.

Representatives to Ontario Provincial Winter Fair:
Wm. McNeil, London. A. W. Tyson, Guelph.

Moved by Mr. Donovan, seconded by Mr. Bell, "That L. H. Baldwin and W. J. Bell be two additional representatives to the Winter Fair Board if four can be secured." Carried.

The directors were asked to consider the appointment of Mr. N. Cosh as judge of Minorcas.

The meeting then adjourned.

FINANCIAL STATEMENT.

For Year ending October 31, 1906.

RECEIPTS.		EXPENDITURES.		
Membership Fees	$276 00	Balance due Treasurer as per last report	$991 51	
Legislative Grant	1,021 25	Directors' Expenses	27 50	
		Memberships paid to Winter Fair	276 00	
		Interest on overdraft	29 74	
	$1,297 25			$1,324 75
		Balance due Treasurer		27 50

Examined and found correct this 13th day of Dec., 1906.
(Signed) J. M. DUFF, Auditor.

(Signed) WM. MCNEIL, President.
(Signed) A. P. WESTERVELT, Treasurer.

DIRECTORS' MEETING.

The new Board of Directors met immediately at the close of the annual meeting.

The following recommendations regarding the prize list were made to the Winter Fair Board:

That the following classes be added: Silver Pencilled Wyandottes, Brahma Bantams, African Geese, Guinea Fowl (in pairs).

That the class of Rhode Island Reds be divided making a class each for Single Comb and Rose Comb.

That the class of Orpingtons, A. O. C., be changed to read Orpingtons, White. Varieties of Orpingtons not classified to show in A. O. V. Fowl Class.

Mr. Scott suggested that the coops for turkeys, geese and ducks should be raised at least 18 inches from the floor.

The directors spoke of the need for accommodation in the Winter Fair building for Specialty Club meeting, etc.

APPOINTMENT OF JUDGES

Plymouth Rocks: P. SCHWAAB, Rochester, N.Y.

Leghorns and Buff Orpingtons: R. OKE, London.

Minorcas, Spanish, Black and White Orpingtons: N. COSH, Port Dover.

Wyandottes and Rhode Island Reds: JAS TUCKER, Concord, Mich.

Game, Game Bantams, and Ornamental Bantams: S. BUTTERFIELD, Windsor.

Asiatics and Hamburgs: WM. MCNEIL, London.

Polands, Javas, Red Caps, Dorkings, Silkies, Sultans, Dominiques, Andalusians and A. O. V. Fowls: L. G. JARVIS, Montreal.

Turkeys, Geese and Ducks: A. THOMPSON, Allan's Corners, Que.

Pigeons: C. F. WAGNER, Toronto.

Ornamentals: WM. BARBER, Toronto.

Utility Pen and Dressed Poultry: WM. BARBER, Toronto, and W. R. GRAHAM, Guelph.

Moved by W. J. Bell, seconded by A. W. Tyson, "That in future no scoring shall be done for exhibitors by the Association." Carried.

It was decided that late entries must be post-marked at Toronto not later than the second Saturday before the opening of the Fair.

The closing dates for regular contributions to the Special Prize List shall be October 15th, 1907. Late contributions shall amount to at least $2 and shall be received by the Secretary at least three days before the opening of the Fair.

Moved by W. J. Bell, seconded by L. H. Baldwin, "That a small plain white card be attached to each special prize ribbon to show what the special is for." Carried.

(A list of members of the Western Ontario Poultry Association is published in the appendix to this Report.

EASTERN ONTARIO POULTRY ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Eastern Ontario Poultry Association was held in the Imperial Building, Ottawa, on Wednesday, March 6th, 1907, at 7.30 p.m. The President, Mr. John A. Belford, in the chair.

In a few remarks the President reviewed the work of the past year and then called on the Secretary to read the financial statement.

Upon motion, the financial statement be adopted.

A revision of the prize list was then taken up and the following recommendations were made to the Executive of the Eastern Ontario Live Stock and Poultry Show: "That the following classes be added: Black Wyandottes, Black Tailed Japanese Bantams and Narragansette Turkeys."

"That the class for China Geese be made into two classes one for Brown China Geese and one for White China Geese."

It was decided that it would be advisable to have a section for A.O.V. Fowls added to the Sale Class.

The following changes were suggested for Pigeons:

"That there be one class for Carriers instead of two."

"That there be one class for Trumpeters instead of two."

"That Oriental Frills be struck out."

"That there be one class for Show Homers instead of two."

"That the class for "Magpies, Black, Red or Yellow" be divided to make a class for Magpies Black, another for Magpies Red, and that Yellow Magpies show in the class for Magpies, A.O.C."

"That the class for Nuns be divided, making a class for Nun, Black, and another for Nun, A.O.C."

"That classes be added for Owls, African, White, and Ice Pigeons."

The prize list as amended was on motion adopted.

The following judges were nominated for the next show: Wm. McNeil, London; Sharp Butterfield, Windsor; L. G. Jarvis, Montreal; C. F. Wagner, Toronto.

Moved by GEO. HIGMAN, seconded by J. H. WARRINGTON, "That exhibitors coming a distance of 100 miles or over be allowed until 10 a.m. Tuesday to get their birds cooped. All other exhibitors to have their birds cooped by 10 o'clock Monday night." Carried.

OFFICERS FOR 1907.

Honorary Presidents.....LORD AYLMER, Ottawa.
HON. SYDNEY FISHER, Ottawa.
HON. NELSON MONTEITH, Toronto.
President.....J. A. BELFORD, Ottawa.
Vice-President.....GEO. HIGMAN, Ottawa.
2nd Vice-President.....W. H. REID, Kingston.
Secretary-Treasurer.....A. P. WESTERVELT, Toronto.

Directors:

J. H. WARRINGTON, Cornwall.
F. J. BLAKE, Almonte.
W. M. OSBORNE, Brockville.
F. A. JAMES, Ottawa.
W. F. GARLAND, Hintonburg.
A. W. E. HELLYER, Ottawa.
C. J. DANIELS, Toronto.

Delegates.

Toronto Exhibition: C. J. DANIELS, Toronto; A. W. E. HELLYER, Ottawa.

Central Canada, Ottawa: J. A. BELFORD, Ottawa; GEO. HIGMAN, Ottawa.

Eastern Ontario Live Stock and Poultry Show: J. A. BELFORD, Ottawa; GEO. HIGMAN, Ottawa; W. F. GARLAND, Hintonburg.

Auditor: J. M. DUFF, Guelph.

Superintendent: R. E. MCKINSTRY, Ottawa.

FINANCIAL STATEMENT.

To January 31, 1907.

RECEIPTS.		EXPENDITURES.	
Members' fees	$109 00	Balance due treasurer as per last report	$757 89
Entry fees	597 15	Fees for entries and poultry memberships	763 90
Birds sold selling class	57 75		
Received from Eastern Show to cover overdraft	757 89		
	$1,521 79		$1,521 79

Examined and found correct
this 2nd day of March, 1907.
(Signed) J. M. DUFF, Auditor.

(Signed) JOHN A. BELFORD, President.
(Signed) A. P. WESTERVELT, Treasurer.

(A list of members of the Eastern Ontario Poultry Association is published in the appendix to this Report.

THE PROVINCIAL WINTER FAIR.

PUBLIC MEETING.

The City Hall, Guelph, was crowded to excess on Wednesday evening, December 12th, 1906, standing room only being available at an early hour. The Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, occupied the chair and called the meeting to order promptly at 7.30.

During the evening an excellent programme of music was rendered under the direction of Captain T. E. Robson, London.

In the course of a few well chosen remarks the chairman said: "It is my pleasant duty to-night to preside, and I know there will be no necessity for any ruling from the chair with regard to order. We have always been accustomed to the best of order in this Hall, and I know that to-night will be no exception. We have with us a number of gentlemen who will be able to discuss the questions of the day as touching agriculture, and I therefore shall refrain from inflicting any remarks upon you at this juncture, but shall call upon his Honor, the Civic Representative, Mayor Sleeman.

Addresses of Welcome.

Mayor Sleeman: I am pleased to be with you to-night, and to be able to extend to you a right royal welcome to our royal city. I hope no one has suffered any inconvenience for want of accommodation. I know it is the wish of the citizens that you should be made comfortable, and they will do all in their power to make you so. I am more than pleased at the rapid growth of your show. I think it was some fourteen years ago that I was one of a deputation that waited on the Agriculture and Arts Association in Toronto to try and secure this show for this city. After being shown the plans of the building that this city was supposed to provide we almost gave up hope, and we came to the conclusion that we could not provide that accommodation. However, your humble servant suggested that we might use the skating-rink, and I am pleased to say that it was accepted, and the fall of that year saw the building completed. I cannot but remark on the rapid increase of the show since that time. That building did good service for some time, but afterwards it became entirely inadequate. I am now led to believe that the building we now have is hardly sufficient for the accommodation required. I can only say that I hope you will not relax your efforts to make the show bigger, as I am satisfied additional accommodation will be forthcoming.

Mr. J. P. Downey, M.P.P.: My task is rendered more easy to-night by the gracious welcome that has been extended to you by His Worship the Mayor. I can only supplement his observations by saying as representative of the great Riding of South Wellington—greater to-night because of its splendid record in the show ring during the past few hours—as the representative of that riding in the Legislature it gives me a great deal of pleasure, and as a citizen of Guelph also to repeat what His Worship has said to you that the citizens of Guelph and the people of the whole County of Wellington desire to make every man and woman that is attending this great agricultural convention this week feel perfectly at home.

I had encouraged myself in the belief the past few years that the City of Guelph had a monopoly in one or two things. I believe, Sir, we had reason to think we had a monopoly in pretty girls in this Province, but year after year this great Winter Fair is graced by the presence of some beauties from distant parts, and I have been shaken in that belief, and I have come to the conclusion that we have not got all the beauty in the City of Guelph.

I extend a welcome to the ladies who are here to-day, working to see if they cannot make life on the farm better educationally and socially, and I say God-speed them in the good work they have taken up; and on behalf of the allied Associations that have been behind this Winter Fair we welcome you to this Royal city of Guelph, founded by John Galt seventy-nine years ago last St. George's Day, eighty years ago on the 23rd next April. We welcome you to the Agricultural Capital of the great Dominion of Canada, the name this royal city has won because of the fact that this great Winter Fair is held here. We welcome you to the home of the Ontario Agricultural College, that institution which in the years gone by, has manned many agricultural colleges in the sister provinces of this Dominion, and agricultural colleges in the States to the south of us; that institution which has won for itself by its representatives such a high name at the great Live Stock Exhibition in the City of Chicago, where its students carried off ten prizes in cattle judging competition against representatives of all the agricultural colleges on this North American continent. We welcome you to this great industrial city of Guelph, the city of commercial enterprise, and the city of happy homes, and I may add, without egotism, of hospitable people. I ask you to make yourselves thoroughly at home. The latch-string is hung on the outside of the door of every house in Guelph; all you have to do is to knock and there will be a kindly word to walk in, take off your hat and make yourself at home.

G. C. Creelman, President, Ontario Agricultural College, Guelph: I have been looking about for a specially good reason why they should have put three persons on the programme to respond to the address of welcome, and after hearing the words of the Mayor and the address of welcome from the member for the Legislature, I have come to the conclusion that I was placed upon the programme to-night simply because I am the only man now living in the City of Guelph who is not directly responsible for this show being located here. I assure you we appreciate to the very fullest extent the manner in which you come, not the first year and the second year, but year after year to a purely educational institution, and here spend your days and dollars in getting what you can from an educational show such as the Provincial Winter Fair. We all appreciate the fact that a man will go to a show where there is something doing all the time in a vaudeville way, and where he is being entertained, but men and women in hundreds and thousands continue from year to year to come to this exhibition which has no claim to entertaining them except in an educational way.

I want to say a word for the Ontario Agricultural College. We welcome you to that institution; we could not get along without you. We have an institution there which is entirely dependent upon you and your families. As President I can say to you that my staff and members of the faculty could not draw our salaries if you were to withhold your support. Hence we appreciate to the fullest extent the fact that you see fit from year to year to send your boys and girls to the Ontario Agricultural College and its affiliated institution, the Macdonald Institute, to have them educated along practical lines. There are two things we are trying to do, one for the boys and one for the girls. We are trying to take your boy and make a

man of him, and develop the brain power that is in him. We cannot take your boys and make good farmers of them, but if you will send us good farmers, then we will teach them how to do things in a more systematic and scientific way than they did before they came to us. We are trying to do a great deal more for the girls than we ever did before. There was a sentiment that prevailed in this country for a long time that mother could teach the girls all that was necessary for a girl to know about the things of this life. We did not look to the school to take hold of the girl and teach her those things which are necessary for every girl to know; we have not up to this time appreciated the necessity for giving the girls some special instruction along domestic lines. Now we have an institution that is practical; where a girl is required to do practical work, and when she goes home, instead of hanging her hat in the front hall and going into the parlor to play the piano, she will put on her apron and say, "Mother, I have learned some things in the Macdonald Institute that will help you to save steps and lighten your labor in the home." We ask you to come out and inspect the Institute, as well as the Ontario Agricultural College, and we will make you heartily welcome.

Replies to the Addresses of Welcome.

Arthur Johnston, President, Provincial Winter Fair: I am simply here for the purpose of expressing to the people of Guelph the feelings we have in regard to the treatment the Board and all connected with the Winter Fair received from the people of this city. On behalf of that institution I can say they appreciate to the fullest extent the fact that the people of Guelph have not only extended a welcome to the people who come to the Winter Fair, but they have supplemented that by very many kindnesses which are remembered gratefully, and many of us will remember them to the last day of our lives. There are a few facts I should like to mention with regard to the Exhibition. It was an inspiration to look at the vast concourse of people assembled there to-day without any hope of amusement without any hope of social position, and without hope of anything but agricultural education. I may say the spirit of the show and the audience, and I have attended every exhibition for the last twenty-five years, never manifested one-tenth a part of the interest, nor have the crowds ever been so great. I can see a great future for this show at Guelph. It is going to tax the capacity of your city of Guelph to provide room, as this building will be utterly inadequate, and I am very glad the Minister of Agriculture is here to see the inadequacy of the accommodation.

John Gosling, Kansas City, Mo.: I am not a public speaker; I am simply a cattle man. The first employment of man was, to care for cattle, *i.e.*, he was given power over the beast of the field and field work. The whole population was then in it. I do not know whether you ever thought of that before. When I came to Guelph this week I wondered if everybody in Ontario was in it. To see the feeling that was shown at the show it seemed to me that you were,—that there was not any other business going on. If I had nothing to say before I came into the hall, after hearing such remarks from the speaker before me, I feel as if I could talk for five hours, and then go and sit and think about the rest all night. (Laughter.) President Creelman told you about what is going on at the College, and invited you to go and see. I want to extend that invitation a mile further, and beg of you to go. It is something wonderful up there, compared with what it was some years ago. The first time I met Dr. Mills at Ames, Iowa, he spoke

about the germ how it had started, and how much it was appreciated. Some years ago I was called upon to examine the papers of seventeen students from five different colleges, on judging beef cattle, and the highest marks went to students who came from Canada. (Applause.) Where are they to-day? One occupies a Professor's chair in Ottawa, Canada,—Prof. Grisdale. Another occupies a chair in Dakota, and another at Ames, Iowa. This will show you that there is plenty of room on the top shelf. It was my ambition always to be somewhere near the top at whatever I tried to do. I could not stop short of being somebody, and that is the thing we want to-day injected into the heart of the boys. A Kansas boy, fourteen years of age, is at Upper Canada College, Toronto. I went to Toronto on Mondey last to see him, and I called up (by telephone) the preparatory school to arrange the time, thinking he was there; but he had passed on to the higher branch of study. He came down half an hour before the time fixed simply because he had got through his studies, and he said some of them would be half an hour behind. That is Kansas blood (Laughter); but his mother and father are Scotch. (Applause.) In Minnesota an Agricultural College student cannot get his diploma until he is able to slaughter and cut up a steer, a pig and a sheep intelligently; and if every boy who goes to this College could do that, you would be glad to let him help out with a great deal of the work in that line on the farm and do it with intelligence, and he could go and judge at a fair with intelligence, being fortified with the knowledge of points and composition of carcasses. When demonstrating we strip everything off the frame of an animal, and then we show the skeleton and show the parts where they were cut from, and place them back so that the student cannot forget which is the roll, and the round, the tender-loin, and so on. If he cannot learn in that way he had better stay at home.

ADDRESS.

By Hon. Nelson Monteith, Toronto.

I do not intend to inflict upon you a lengthy speech, but I desire to make a few remarks on matters that seem to press home upon me. This is the great agricultural event of the year. We have had all our other fairs, and they have been successful this year beyond measure, but this to my mind is the great event because the farmers of this province will gather here in such large numbers and spend several days in thoughtful consideration of the great possibilities of their calling. Agriculture is the great industry upon which the foundation of the success of this Province is built, and it is something that is of primary interest to every citizen throughout the length and breadth of Ontario. This is our own Ontario Provincial Winter Show, a show at which the cream of our beef cattle, sheep, swine and poultry is represented, products of which represent over fifty million dollars annually to the farmers of this Province. The ideal animal comes here and is judged, and you have an opportunity of seeing what can be produced in the several lines of live stock. It is perhaps unnecessary for me to impress upon this audience the necessity for high ideals, but there are a few other questions that possibly I should be recreant to my duty if I did not draw your attention to.

What makes for the uplift and furtherance of agriculture in this country? The one thing, I believe, that of all others will make for it at this

period of our history, is that we have more enthusiasm in the work. Not that explosive enthusiasm, but that solid determination that means to put the agricultural interest above and beyond any other interest, and put it in its proper place in this great Province. The dignity of a calling is its utility, therefore what calling is of greater dignity than that of agriculture. Things are improving in this line to some extent; I feel when I go over the length and breadth of this great Province and come in contact with those engaged in agriculture that to be an agriculturist is no mean honor. We see before us at this convention comfortable, prosperous, progressive, intelligent and industrious people; people, alas, who are not increasing in numbers, and why so? We have a most dignified calling, yet our young men are deserting it and our young women are deserting it and going to the city, or going to the West. We need the boys and the girls on the farm, and we need them in our social system more than we ever did, to properly balance the great political system under which we live. There is a stability about the rural population; I do not say it in the way of flattery, but I say it because I believe it. Therefore, I say it is one of our first duties, as far as possible, to maintain this balance, and keep our boys and girls upon the farm, and make the conditions attractive there. I would go further and attract back from the city those who are longing for a broader and wider sphere to live in than the workshop. I think there are a great many branches of agriculture such as poultry raising and fruit raising that residents of the city might well come to the country and engage in profitably. I recognize that one of the great drawbacks to country life at the present time is lack of suitable and available labor to carry on the work; that is one of the things that is turning our farms into cattle-runs. I speak with a certain amount of feeling in this matter. We cannot hope at present to attract from the city labor to fill the gap, and we must look further afield, and the officers of the Department over which I have the honor to preside have been in some measure successful in bringing out numbers from the old land to this Province of Ontario. We are somewhat handicapped because everybody, apparently, at home and abroad is attracted by the vast possibilities of the West, and many of those that come to our Province get inoculated with that spirit and leave us and go West. Let us not forget that the possibilities for making headway in life are just as good in this Province of Ontario as in any other place (Applause): just as good as they ever are in the West, or ever will be. You hear of the men who succeed and make wealth, but do you hear of the men who fail? I believe it is one of our first duties to see to it that our farms are peopled, and that sufficient help is available to carry on the great work of agriculture. I can promise you that the Department of Agriculture and the Government itself is in duty bound to take up this matter and see it to a successful conclusion. It is our purpose during the coming year to put forth a greater effort than ever to attract to our beautiful Province the great tide of humanity that flows from the old land. We hope to be more successful than in the past; we hope to get a greater number of these who have a knowledge of agricultural methods to come and settle among us.

There are a few lines in which we have excelled ourselves. I believe co-operation is one of the great methods by which agriculture can be promoted and uplifted still more and more as the years go on. We co-operate in the dairy industry and in the fruit industry, and we might well do so in many other industries. Co-operation in the poultry industry would afford many advantages. We are living only to-day: to-morrow is not ours: yesterday has gone, and we sometimes put off, and say we will have these

facilities in the days that are to be, but we are living to-day and we should have them now. The farmers of this Province are prosperous and they have much money. Why, therefore, should they deny themselves the advantages that would make life better worth living? The providing of better appliances in the home is one thing that we might well pay more attention to. The telephone, I believe will spread throughout this land, and I trust we shall before long have a rural mail delivery. (Applause.) These are the things that would tend to keep the boys and girls on the farm, and what better help can we get in the furtherance of this great calling of agriculture than those who have been born to it?

We are glad indeed to again assemble together at Guelph. It has ever been a pleasure to me to come to the Royal City, of which I have so many pleasant personal remembrances. For me there is something of sentiment attaching to Guelph, because of the fact that my father was here when Galt cut the first tree.

We have to-night with us a number of gentlemen who will address you, and I hope our meeting will be a pleasure, and that we shall all carry away with us the feeling that it has been good for us to be here. I hope during the continuance of this show you will still further avail yourselves of the opportunities it offers for enlightenment in this great calling of agriculture.

EDUCATION AND ENTHUSIASM.

By C. C. James, Deputy Minister of Agriculture, Toronto.

The keynote of my address to-night is "Education and Enthusiasm." If the Winter Fair, and all that belongs to it, stands for anything it stands for these two ideas, "Education and Enthusiasm;" and the moment we drop away from the educational idea, or the moment we lose in the enthusiasm that has been characteristic of these meetings, that moment the Winter Fair will begin to move on a down grade. Those of us who have any responsibility in connection with it, whether as members of the board or as officers, or as simply contributors to it, should ever keep that on thing in mind: and that is, that, judging from the past, the future of this Fair must be attained only by keeping in mind these two things: education of the right kind, and enthusiasm of the right kind.

At this time of the year, we have been accustomed to try and balance the books; to see whether any progress has been made; and whether there are any promises in the future for this great agricultural industry. Three or four months ago, I was invited by two prominent officials of one of our railways to meet them and discuss with them a very serious situation. I went to their office, and had a talk with them, and this was the question. "Do you know that the shipments of grain in this Province are falling off in a remarkably serious manner? We are not shipping the grain that we ought to ship; we are not getting the business that we ought to get. What has gone wrong with the agriculture of Ontario?" Why, nothing has gone wrong with it; everything is going right. Only a week or ten days ago members of the grain section of the Board of Trade of Toronto asked for an interview with the Minister who is our chairman to-night. What did these men tell us? Practically the same story: "We cannot get the grain. Grain is not to be had, yet your reports indicate that the farmers are growing more grain than ever. Something is wrong." Nothing is wrong, at all; every-

thing is going right; and if we had these men here to attend the Winter Fair, and to listen to the lectures, that are being given, and to see you and talk with you, they would get the answer, and they would perhaps be convinced. What has been the mission of this Winter Fair? Going back as we do for the past fifteen years its mission has been to stop shipment of grain over the railroads of Ontario. The mission of this great Winter Fair has been more beef, more bacon, more mutton, more poultry, more butter and more cheese, and less wheat, less oats, and less barley to be sent off from the farms. And the fact that it has been brought home in a business way to the great railroad corporations, and to the men who make their living in the handling of grain in this country, is one of the strongest proofs that this Winter Fair has been accomplishing that purpose for which it was founded. The farmers are producing the grain, but instead of sending it from the farms, they are shipping from their farms the finished product such as you will see on exhibition. The old agriculture is gone; the new agriculture has come; and it is only when we look back, for perhaps forty or fifty years, that we realize what a wonderful change has come over the agriculture of this province. The change has been going on year by year,. We are not standing where we stood a year ago. Very important developments have taken place in the meanwhile. You say, "Is it now simply a question of beef, and bacon, and butter and cheese, and poultry? Is that now the object of the young man who is starting out as a farmer? Is that the whole problem? Has he simply to find out how he can best produce a pound of any one of these articles? Is that the whole scheme of agriculture?" Well, if any man sits down and satisfies himself in that easy way, he will soon find that the agricultural problem of to-day is far more complicated than that. We are not very far away from the time when agriculture in this country meant as large a number of bushels of wheat as possible, at as low a cost as possible, and the same with barley and oats, and hay; because in the United States these articles could be marketed and a certain amount of cash could be got; or articles could be taken to the store and changed for goods that each family required. It was then, a comparatively simple question. But now, it has become very much more complicated than that, and the young men who are fitting themselves for farm work in this country, should see to it that they get into their minds a clear comprehension of the greatness of the question as it is now presenting itself. Agriculture is becoming one of the most complicated questions for solution that we have in this country. It is a comparatively easy matter for one of the manufacturers in this city of Guelph who is producing one line of goods, to know what he is doing. He has the market price, and the price of labor and material, and he can work out that problem from the start to finish easily, in comparison to the problem which is presenting itself to the farmer to-day. There is not a man, producing in this Province to-day, who has so complicated and difficult a question to solve as the farmer. The young man who wishes to set himself right, should begin at once to carefully study those other elements which are beginning to enter in, and which complicate still more the question.

I have here four items which it seems to me in the near future will still more seriously complicate the great question of production by the farmers of this country. For instance, there is going on in a number of the countries of the world to-day, a production of gold to an enormous extent. Every country that has been known to produce gold is being worked to a far greater extent than before. The gold production of the world is increasing enormously. This increase in the next few years is going to

have a very important effect upon the price of other products; and that is a point that the farmers, who have the most important products in this country, should carefully understand. Is the production of gold in countries going to increase rapidly enough to cause a rise in the farmer's products? Follow that out, and see if it has not a bearing on the farmer's products.

The next question that is coming directly home to us in this country is the wonderful development of transportation facilities. The last time I addressed the Winter Fair, I made some reference to the great trans-Continental road that was then, so to speak, in the air. It is now to a large extent upon the earth, and instead of one new road we have two. You cannot build a trans-Continental railway from the Atlantic to the Pacific, without its having some very important effect upon the farm owned by every individual before me to-night. In addition the roads that we have here now, are sending out their branches in all directions. That is an element that has to be carefully considered. It is going to have an effect upon the agriculture of this country. What that effect will be, I am not going to prophesy.

The next is the development of cheap electric power all over this Province. Do you mean to say that is going to affect only the city of Guelph, and Stratford, and Hamilton, and Brantford, and London? If that is all the good it is going to do, then I doubt very much if we are doing our full duty to this Province. The farmers of this country have as much interest in cheap power as anybody else. There is going to be a general distribution of this power throughout the eastern and western portion of this Province. Are you not going to be affected by it? It may be, that within four or five years, you will see this power line at your door. Surely that is something which is going to affect, very materially, the outcome of the agricultural work in the next five or six years.

And the last point is something very much more remote. And that is, the opening of the Orient. Japan has opened her doors and has awakened to national life. She has stepped across the sea, and opened the door of Corea, and shaken China out of her long sleep. When the 500,000,000 people in China, and the many millions in Corea, and Manchuria, open their doors and offer to trade with the rest of the world there is going to be some stir in the manufacturing life of the world. The farmers on the prairies of the Northwest, and the farmers in this Province, will in time, feel the effect of the awakening of those nations that have been so long asleep.

Agriculture is not a dead subject; it is not simply marking time; it is showing greater signs of development to-day than any other line of work that may be mentioned. It is expanding and broadening, and the men who are going to make the greatest success in the future, who are going to get the greatest benefit out of this movement, are the men who are going to put themselves in closest touch with the great educational movement which makes for the expansion and up-lifting of agriculture.

This Winter Fair, no doubt, in the next few years, will see many changes. As agriculture changes, we will have to change this Winter Fair. We may have to enlarge it, it cannot stand still. We cannot go on giving simply the same thing year after year; otherwise, this Winter Fair will be left behind.

One thing I would like to leave with you, whether you are veterans in agricultural work, or whether you are the strong men whose shoulders are now carrying the burdens of agricultural work in this country, or whether you are the young men in the full vigor of life, looking out with hope upon

your future, and it is this: You are most likely to have pleasure in this work, and to get the most out of it, and to make the best use of it, if you recognize agriculture as not a simple thing, but as complicated, and affected by all these great world movements; and the man who develops himself along the right line will have the greatest possible means of success.

Those of you who come here from year to year, have the best wishes for the Winter Fair; those who come to visit us give us encouragement by their presence. Keep up your enthusiasm and never lose it; because in that enthusiasm is the key to the great success of this work.

RURAL EDUCATION.

By W. M. Hays, Assistant Secretary, Department of Agriculture, Washington, D.C.

I am quite overwhelmed. This is the flower of Canada; and down in the Fair Building are the fruits of your labors, and on yonder hill is the flower of your educational institutions. I have visited your homes, and learned of the geniality of your people. When I sat in one of the meetings of your Experimental Union, unknown to the speakers, and found they were saying things about my country, and the way we are generous to you in sending you some bulletins, as you send yours to our country, and saw your real feeling towards us, the blood tingled in my veins; and I realized that these people sitting here, are in their nature, and genius, and feeling, more similar to us than your relatives on the other side of the seas. A great land this, secured in the glacial area, with its mixed soil and mixed people. The most wonderfully opportune people on the face of the earth.

I am proud of your show; I am proud of the fact that it is centred around educational ideas; and educational plans. Here, the judge gives his reasons for his decisions. It is centred in the wisdom given out in your lecture room; it is centred in the wisdom of the judges of the carcases and the finished product of your farms. I was immensely proud of your show as I saw it on the lower floor; and when I saw your most magnificent poultry show, I was prouder than before. I have not seen its equal.

I come with something of a message to-night. I am going to state it simply, and plainly; and then I am going to talk about it in a general way. With the great agricultural states, from New York, and possibly Quebec, and Maine, and through the great Plains, and from what we on our side call the Mason and Dixon Line, to the region where it is not yet settled; that is the greatest agricultural bunch of land on the face of the earth; and they are piling up immense wealth. They are not only building up the great cities and the great trans-continental routes, that are connecting city with city, and the great chain of rivers and lakes, upon which our merchandize is carried, and the great electric roads, and before long, possibly we will be carried through the air. We are placing a great amount of wealth on the farms and public highways, we are putting better buildings on the farm, better churches in the country, and we are going to put a great deal of this wealth into educational institutions, under the leadership of such men as Mr. James, who has spoken to you so well to-night. We are going to have an educational system, far more complete than we have now. We are going to have in our rural school system, a system of education, including the rural school, the secondary school, and schools of the college grade. We are

going to have the country school made into a farm school; a little consolidated school, if you please, accommodating an area of five miles square, with a van to bring the children to school; a cottage for the principal, and a principal educated to teach agriculture, as well as other subjects, with an assistant principal trained in teaching home economies, with other teachers to aid in the general primary studies. We will have these in every area that has land worth $40.00 an acre. This is a matter of immense importance, because it is going to bring to every farm boy and girl an agricultural education. This is a foundation part of the school system, for country life; and by no other class of school can we carry the products of agricultural research to all the people. In order to carry this out successfully, we need secondary schools, and the next step is an agricultural college to produce teachers for the agricultural high schools.

When the faculty at the University of Minnesota took up this school idea, and undertook to build a college course on top of it, they could not at first see how we could carry the work through; but during the last fifteen years, it has been accomplished. Two years ago Minnesota started a second agricultural High School. We found there were very few students going to that school from the Red River Valley, and we decided to put an agricultural High School up there, and it has been a great success.

Mr. James made a wonderful statement about the changes that are going on in agriculture. Let me mention one or two matters along the same line. The experimental stations on this continent, and on other continents, have spent in the past twenty-five years about $50,000,000 in agricultural researches. In another twenty-five years this very rapidly increasing line of work will have used half a billion dollars. This will produce such a wonderful body of knowledge regarding scientific organizations, and the management of the farm, and the development of plants and animals, that it will furnish material for this kind of education carried out by the scheme I have mentioned. Eighty years ago seventy-five per cent. of the people in the United States were on farms; to-day, they are only twenty-five per cent. What has taken the people from the country to the city? The great attraction of large manufacturing centres. Our problem is not to keep many people on the farm. We want only enough people in agriculture who can have all the support that the family can give; a fairly good income; can travel some, and have a splendid education, and can pay for it. Our problem is to take care of that twenty-five per cent. who remain on the farm, and we want to educate them, that farm life will be attractive to them; and if we succeed in doing that, we will have accomplished a great thing.

ADDRESS.

By Dr. J. G. Rutherford, Live Stock Commissioner, Ottawa.

I owe you a double apology. The fact is that during the past two or three weeks I have been indisposed; I have been suffering from a very severe attack of bronchitis. I have also been suffering from an attack of Meat Inspection Bill, having been engaged in drafting the new measure, which, owing to the recent revelations in Chicago, it has been thought advisable to enact. The situation was somewhat complicated by the expressed desire on the part of my Minister that the measure referred to should not only deal with the inspection of meat, but also with the inspection of fruit.

vegetables and fish; three articles about which I know, at least in an official capacity, comparatively little. And my indisposition has also been intensified by the celebration of the annual festivity of the patron saint of my nation, St. Andrew. As President of the St. Andrew's Society of Ottawa, I have had to oversee and generally direct the arrangements for the triumphal march of the Great Chieftain of his race, "The Haggis"; so that I am sure I have the sympathy of the audience. I may add that it was only at six o'clock last night that I left the House of Commons, after the first reading of the Meat Inspection measure to which I have alluded.

As I have had the pleasure of saying before in this hall, it is a very great treat to me to come to Guelph. I am not a stranger in Guelph, although it is some time since I lived here. I was not here when the first tree was cut down, as was Mr. Monteith's father, but I am rather startled on realizing that it is, after all, only seventy-nine years since Guelph was founded, and that I was actually here when this flourishing city was only forty-eight years old. Thirty-one years ago I was a student at the Agricultural College. There were just seventeen of us at that time, and I had another shock to-night when I heard that we seventeen were the germs, the original microbes, as it were, to which the growth of scientific agriculture on this continent owes its beginning. (Laughter.) To a man who has all his life been engaged in a struggle against bacteria, to find that after all he is one himself, is a distinct shock. Of these seventeen original germs a number are still to the fore. Very few of them are farmers; some of them have gone into the learned professions; I do not know that any of them are in the Church; one or two have become doctors, one is a railway magnate, several are aldermen, and one has even become a mayor. Three or four are dead, and two have gone further and become lawyers. (Laughter.) You will see that this bacterial culture, the first incubation, so to speak, was scarcely a success.

There has been nothing more interesting to me than to watch the progress of the Agricultural College. The younger generation does not realize how much is due to the Agricultural College at Guelph, nor how much is due to the men who first crystallized into actual practical operation the idea of agricultural education in this Province. The work has been simply wonderful in its developments; it began by the young men going back to the various communities from which they came and applying the scientific methods of which they had acquired a knowledge at the College, and talking about these methods, with the result that after a while the semi-tolerant criticism with which their new departures were first greeted, was succeeded by an active spirit of interest. Later the men in charge of the College, realizing that the time had arrived for further active measures instituted the system of Farmers' Institutes, and the work has since gone forward by leaps and bounds. If there is any one thing that is admirable in a gathering of this kind it is the evident anxious desire of all who attend them, young men, middle aged men, old men and women too, to carry away with them all the knowledge they can possibly get. Visitors from the Old Country at our various Canadian agricultural gatherings are all impressed with the same feature, namely the anxious desire of our people to carry information away.

You recollect the manner in which Mr. Johnston enlarged on the beauty and intelligence of the audience, and how he stated that he had addressed meetings and had been present at gatherings in Scotland and England, but had never seen an audience to equal this. Between ourselves and in the strictest confidence, I was in Scotland with Mr. Johnston and heard him

address a meeting there, and he excelled himself: there was no nationality in the world so dear to him, there was no people on earth to equal the Scotch, no women so fair, no men so intelligent.

It was said to-night that the old students are sending their sons to the Agricultural College, and while I have not sent any of my sons to the Agricultural College, because I have no sons to send, I have a few daughters, and I am inclined to think that some of these daughters will be very likely to find their way to the Macdonald Institute. I am very strongly impressed by the work that is being done by that Institute. I am very glad that after a long time the ladies are coming into their own.

I was greatly impressed with the other speeches, and I think you have got just as much solid mental food as you can conveniently carry away, and I am therefore, as you will observe, acting on the theory that perhaps a little in a lighter vein will not be out of place.

A few remarks were made about the progress which agriculture is making in Ontario. I spent some twenty years in the West, and for thirteen of those years I never came East and when I did come back, I can assure you I was more than gratified. I was deeply impressed by the great advance that had been made, the great improvements which had been achieved in the agriculture of this Province. At the same time things are advancing very rapidly in the West, especially in the live stock business, and the western live stock men are in close touch with you here. Representatives from the western provinces are attending this fair, and the men from the West are dropping in from time to time, buying a bull, a ram, or a boar and taking them back to that western country to help to build up their herds and their flocks. The country up there needs your live stock and I want to impress you that you must not neglect the western market. To my mind the day has gone by when the best market for the stock of Ontario is in the United States. I think our best market for our pure-bred stock is right in our own country, and that in Manitoba, Saskatchewan, and Alberta we have a market for all we can grow.

When the western Aberdeen-Angus men insisted upon having the headquarters of that Association in the city of Winnipeg, eastern men who were interested in that breed felt rather sore, and I said to several of them: "You are making a great mistake in being angry about it. This is one of the best things that ever happened to you. Your breed is going to the west, and you are going to have your breed settled in the west, and mark my words, the Shorthorn and Hereford men will lose in the west if you properly appreciate the situation, owing to the fact that the headquarters of the Aberdeen-Angus Association are in Winnipeg. I do not wish to see the grand old banner province of Ontario move the headquarters of all its breeds to that western country, but I want you to look at the western market as yours, to keep it, and to send your agents out there to work up that market and maintain a proper connection with your customers both present and future.

A remark somewhat savoring of regret was dropped by the Hon. Mr. Monteith in reference to your sons and daughters going west. I do not think you should mind that. Ontario is strong and great and good, but there is a great country in the West, and it is largely being taken up by foreigners. We are getting in a good many emigrants, some of whom we could do very well without, and it is a good thing indeed to have the leaven of the good old Ontario stock out through the newer Canada of the prairies.

A young man from Ontario goes west, gets one hundred and sixty, or perhaps three hundred and twenty acres of land and inside of two years he is a large purchaser, and his money comes right down to this Province of

Ontario. He buys his agricultural implements, furniture, and other manufactured goods, and thus assists in the development of your trade and in increasing the size of your cities. We are all under one flag, and all in one country, and it is not well to be patriotic only to one's native Province.

The progress which Canada has made in the last four or five years is simply phenomenal. The attention which she is attracting in the civilized world is remarkable in the extreme. Canada is becoming known and recognized, and we are to-day taking our proper place as the brightest jewel in the British crown; the greatest integral part, in point of territory, of what is to-day the greatest Empire the world has ever seen, and what with all due deference to our American friends and their great, glorious and progressive country, we Britishers take a certain amount of real pride in styling ours as the greatest self-governing country in existence.

LECTURES ON PRACTICAL SUBJECTS DELIVERED IN THE LECTURE ROOM IN THE WINTER FAIR BUILDING, GUELPH.

THE POULTRY INDUSTRY.

The Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, occupied the chair during the meeting at which was discussed the subject of poultry. In opening the meeting he said: We have, gathered together in this building, what may safely be said to be the largest poultry exhibition that has ever been held in Canada. It exceeds in numbers that of last year by over four hundred entries, showing that the poultry industry is by no means a waning industry. The prices obtained for poultry products during the past year would seem to justify us in the belief that what we have already accomplished is but a foretaste of what is to come. They have been higher than for many years, and the prospects are that, with the increasing population in our urban centres, still higher prices are bound to prevail. Such being the case it naturally follows that this branch of agriculture should grow rapidly. It is one of the lines of agriculture that has a great many votaries. It does not require a very large amount of capital at the outset. We are trying to make the farmers throughout the country recognize that they can keep a small flock of poultry without much additional expense. No doubt this exhibition is largely supported by, what we may term, poultry fanciers, men who have made a specialty of some particular breed and have left almost everything else aside for that hobby; yet it is not a hobby; it is something that people can follow with profit and add vastly to their knowledge, and coming here from year to year, they receive great benefit from the educational part of the exhibition.

I do not believe the onlooker receives anything like the benefit that the exhibitor does. It is only when we enter into competition that we are spurred to that keenness of intellect that gives us a greater interest in our business. We are trying to develop the local poultry shows in the various centres where the amateur can come out and contest for the prize with a fair hope of success. He is no common amateur who is able to come down to the Guelph Show and get a prize of any kind.

You are not here to-night to listen to any extended remarks I may have to make, but I may tell you, in passing, that it has been the purpose of the

Government, during the past year or two, to add somewhat to the vote for the poultry interests. We do not say that in any spirit of boastfulness on behalf of the Government. We are merely the servants of the people, and it is our duty to watch the trend of interests and to spend the money where the greatest amount of good can be done, and anyone who has watched the expansion of the poultry trade, will recognize the fact that the poultry interests, in this Province, are bound to grow and become even more important than they are to-day.

Six years ago the poultry entries at this show were about 1,000; this year they exceed 4,000. We hope as years go on, that this work will increase and will justify still further the expenditure the Government is making in this connection.

I have great pleasure, indeed, on behalf of the Exhibition Committee, to welcome you here. We hope you will take a lively interest not only in the poultry branch, but every other branch that is illustrated in this great show. We believe this to be one of the greatest shows on earth. (Applause), and I say that in no boastful way. I do not say it is the largest show, but I think it is the greatest educational show in America. I hope the lectures to-night will be beneficial to all.

HOW MUCH POULTRY CAN BE KEPT ON A HUNDRED ACRE FARM?

By J. W. Clark, Cainsville.

The subject given me is quite a difficult one to take up. The conditions are so varied on a majority of our farms that it is difficult to arrive at a conclusion as to how much poultry should be kept. There is no doubt, the farmers can raise poultry better and cheaper than anyone else, because he has a lot of waste foods in his fields that the poultry can gather. It would be useless to try to raise any quantity of poultry unless you had the proper help to look after them; you also require a suitable place.

The farmer should have, at least, 100 layers. He would require a building of about 12x60 to accommodate these, that is, putting about six square feet to each hen, allowing a feed room at one end. It would be necessary for him to raise at least 300 chickens in order to select 100 pullets each year. There is a great deal in selecting the proper type. Then he would require suitable conditions for raising these chickens. He would require an incubator to hatch them in. It would be almost impossible to hatch them early enough with hens. As a rule hens do not get broody until May or June. Three hundred chickens would require a lot of labor, especially where they are fed by hand, but under the new system of hopper feeding, a lot of the labor is done away with. When the chickens are put in the brooder, they will require hand feeding for a few days, and after that you can put in a small hopper. As soon as they are large enough to put in a colony house you can put in a large hopper that will hold 3 or 4 bushels of feed, and allow them to go and help themselves, and you would only require to fill it once a week. I have raised between three and four hundred this summer, and I can say, from my experience, that the chickens have done far better when fed this way, because I am able to get them away out in the orchard

where they get plenty of range. I think an orchard is an ideal place for chickens. If you are raising fruit you will find your apples will be practically free from the codling moth. After your grain has been taken off the fields you can shut your colony house up at night, and in the morning hook on the horse and draw it out in the field, and you will find they will soon pick up a lot of grain, and they will glean your fields and save a lot of expense, and they will thrive and do well.

The water problem is a great difficulty where you have to carry the water any distance in a small vessel. I have a barrel on a small stone-boat and have a tap in the bottom of the barrel, so that the water will just drip, By keeping the barrel covered the chickens can be watered with very little labor. The water in the barrel will last for two or three days. I think a large corn-field is a splendid place in which to turn chickens, especially young chicks. Professor Graham raised a large number in a corn-field, and gave them no water whatever, and they did remarkably well. From fifty to seventy-five ducks should be raised on the average farm. You would have to have a male and two females to get this number. If you have a good local market you should hatch them under hens. The duck is not so profitable if kept over eight or nine weeks of age. Give them all the feed they will eat up to that time and then market them. You can hatch enough under a hen to kill at one time. You will get probably from nine to twelve ducks hatched under each hen.

Q.—You must have pretty big chickens?

A.—I have the Orpington and I put twelve eggs under them. I would not risk that many early in the season. The farmer with 100 acres could also raise from 25 to 30 turkeys and could also raise from 20 to 25 geese. I do not think any fowl on the farm is more profitable than the goose, because they will live on pasture and you can carry them over the winter with mangolds or turnips. I would have the pasture divided off into lots in order to give them a change. It is not necessary to have a pond, running water is all right if you have it.

Q.—What kind of food do you put in this hopper?

A.—Wheat screenings.

Q.—Is not good wheat cheaper?

A.—No, I would prefer the screenings; we can get them for a cent a pound.

Q.—What do you have to pay for good wheat?

A.—You can get it now for 70c. or 75c.

Q.—I would prefer the good wheat?

A.—For young chickens I think screenings are the best; I do not mean half chess and oats and stuff of that kind.

Q.—Would you give them corn?

A.—I do not think much of corn for young chickens.

Q.—Do you only put one kind of grain in the hopper?

A.—Yes.

Q.—Do you put in any meat scraps or anything of that kind?

A.—Not when they are running out, I give them all the milk they want.

Q.—That is the effect of feeding too much corn?

A.—It is apt to stunt them, the same as you would if you fed too much to young pigs.

Q.—What kind of ducks do you raise?

A.—Pekin ducks.

Q.—What do you do when you find half of them are taken by hawks?

A.—When you are troubled with hawks the only way I know is to shoot them.

Q.—Last year we hatched out 200 chickens, and the hawks took 100 of them. I offered a man $5.00 to shoot the hawk, and he could not do it.

Q.—I have heard that a trap on a high pole is the best way to get a hawk.

Q.—What about rats?

A.—My houses are built on cement foundation, and I have never been troubled with rats. My brooders are put up on runners so that the cat can get under, and I have a fox terrier, that goes around with me, and he hunts out the mice.

Q.—Can you tell us anything about a brood of fowls called Faverolles?

A.—Yes, I have heard of them, they are a good table fowl, but they do not seem to be becoming popular in this country. They are a French fowl.

Q.—What would you advocate feeding for winter laying?

A.—I would say a mash composed of 40 per cent. bran, 25 per cent. corn chop, 25 per cent. oat chop, 10 per cent. beef scrap mixed with milk hot. I would prefer green bone if you could get it.

Q.—I understood Mr. Graham kept chickens in the corn-field without water; what substitute did he have for water?

A.—The dew is the only thing I know of. The chickens made remarkable growth. Milk is an ideal food for young chickens. I give them all the milk they want.

Q.—Is buttermilk a good thing for chickens?

A.—I never tried it, I would not like to give it fresh.

Q.—What do you feed chickens the first few days after hatching?

A.—I like the prepared chick foods that are on the market. If you have not got that bread crumbs and chopped eggs are good. Young chicks do not do well on sloppy food. Supply them with some kind of green food, such as a sugar beet or mangol grated up fine, it assists digestion.

Q.—Then you advocate dry food and dry water? (Laughter.)

A.—Yes, I do not say that I raise my chickens without water.

Q.—Would you recommend giving little chickens water when you first start to feed them?

A.—Yes, I would recommend giving them water right from the start. I would give them all they want, unless they were very thirsty, from the fact that you had forgotten to water them, then I would not let them gorge themselves. If you are feeding dry food then you must give them water, but on soft food they do not require so much water.

Q.—Are your hens laying now?

A.—Yes, I am getting a couple of dozen a day. I feed them a mash just before they go to roost.

Q.—Do you put pepper in the mash?

A.—No.

Q.—Do you think it is good feed for them when we have zero weather?

A.—On an exceptionally cold night I would take some corn and warm it and give it to them before they went to roost.

Mr. Gilbert, Experimental Farm, Ottawa: I have no desire to intrude, but I think there is a very important phase being left out of Mr. Clark's address. I meet a great many farmers in going about this country and they say, "It is all very well to talk about raising chickens in incubators, but at that time of the year we are very busy plowing and other work, and what are we to do?"

A.—Let the women do it.

Mr. Gilbert: You are a bachelor, because you would not say that if you knew anything about what a woman has to do on a farm. The crying trouble with the farmer to-day is the labor problem. But what about the boys and girls? Why not let them run the incubators? I have tried that with my own children, and I find that boys and girls can operate incubators a great deal better than old people. You can say to them, "I will give you one-half the profits if you will take charge of this part of the work." That way you enter into partnership with your sons and daughters, and you may inculcate in your children a love for the work and for the farm, and they may never leave the farm. Too many of our boys and girls wander away from the farm and never look back.

FATTENING CHICKENS FOR EXPORT.

By Adam Armstrong, Fergus.

We have been at this business now some six years. When I first started I went to the planing mill and had them make 100 fattening coops, each coop capable of holding 20 birds. We could thus fatten 2,000 birds at a time. We did not have 2,000 birds to start with. I employed a man who was an expert at fattening chickens and it was not long before we had our coops full, and they did well, but there was a number of birds that seemed to take indigestion and a number of them died. When the season was over we balanced our books and we were $100.00 behind and we had 100 fattening coops on our hands which cost $175.00, making a total deficit of $275.00 and then I thought of the plan of letting the farmers have these fattening coops and do the fattening themselves. One man put 20 birds into a coop he got from us, and when he took them out they had paid for the coop and paid for the food and he had 10c. left over on that lot, and he had the coop to the good, and he was well satisfied. The next year I gave out eggs to an farmer who would bring me back the chicks. I sold the eggs at 25c. a setting. In that way the farmers got well bred birds and we got a higher standard of birds to fatten and, by that means, we have now got nearly all the birds in the district pure Plymouth Rocks. There may be other varieties as good as the Plymouth Rock but we have not found them yet. At the present time I have 150 of these coops out with the farmers who are feeding the birds and bringing them in to us and I have placed an order with a saw-mill man to make 100 more coops, to distribute out among the farmers and I am going to let them have them for nothing but I must have the birds they fatten in them. We are now paying 9c. a lb., for crate fattened chickens alive. Last week we weighed in 850 of them and to-day and yesterday we weighed in 350. That will show you the interest the farmers are taking in our district.

Professor Graham: How many do you take in, in a year?

A.—In 1903, 1,467; in 1904, 1,973; in 1905, 2,994, and in 1906, 3,607. By these figures you will see that it is gradually increasing and this has been done by getting the farmers interested in the fattening of chickens and by showing them the benefit of fattening in this way. I also use a circular which I distribute among the farmers, as follows:—

To fatten birds for the export trade it is necessary to have the proper coops to put them in. These should be two feet long, twenty inches high and two inches deep, the top, bottom and front made of slats. This size will hold four birds but the cheapest plan is to build the coops ten feet long and divide them into five sections.

What to Feed: Oats chopped fine, the coarse hulls sifted out, two parts, ground Buckwheat one part, mix with skim milk to a good soft batter and feed three times a day; or black barley and oats, two parts oats to one part barley. Give clean drinking water twice a day, grit twice a week and charcoal once a week. During the first week the birds are in the coops they should be fed sparingly, only about one half of what they will eat. After that gradually increase the amount until you find out just how much they will eat up clean each time. Never leave any food in the troughs as it will sour and cause trouble. Mix the food always one feed ahead. Birds fed in this way will be ready for the export trade in from four to five weeks. Chickens make the best gain put in the coop when weighing three to four pounds each.

I happen to have in my coops at home a batch of chickens, I got from a farmer, that were not crate fattened. He brought them into town and asked me to buy them. I asked him, "Are they crate fattened," and he said, "No, but they are just as good," I said, "I cannot give you more than 7c. a lb., and I do not want them even at that price, but, if you will take them home and feed them five weeks, I will give you 9c. a lb.," He would not do that, and I put them into crates and fed them, and in five weeks they made an average gain of 2.5 lbs: and they just about doubled their money in the five weeks. If I had kept track of the cost of the feed I think I would have made, at least, from 13 to 15c., per head for the five weeks feeding. One young man told me this year that it just cost him 13c. per bird for the five weeks, and they gained 2 1-3 lbs. in that time. I fed them three times a day for the first two weeks and twice a day after that. You can feed them just as well at night as in the daytime and you can put the feeding coops in the pig-pen and fed them at the same time as the hogs.

Q.—Do you think you should keep them in the coops five weeks?

A.—I certainly do. We have tested them in three weeks, four weeks and five weeks, and we get the best birds in five weeks.

Q.—Would it be advisable to coop up ducks?

A.—I do not know anything about ducks.

Q.—Do the farmers feed them five weeks?

A.—Yes, you can injure the birds by keeping them too long. We, occasionally, get a bunch that has been kept seven weeks and they are not as good.

Q.—What is the difference between a crate fed bird and a stall fed bird?

A.—There is a great difference, you can tell it at once. There are muscles in the stall fed bird and there are none in the crate fattened bird.

Q.—Do they eat their feathers?

A.—Yes, I have found they do. This year I put a little more salt in the feed, and I did not have any trouble with feather eating.

Q.—Do your birds moult?

A.—Yes, quite often.

Q.—What kind of grit do you use?

A.—I like the mica spar; any kind of gravel will suit.

Q.—Did you ever try fattening old birds?

A.—If you take an old bird and put it into a coop and fatten it, it will do better than a ordinary chicken running around. The muscles will be gone and it will be almost as tender as a chicken.

PRECAUTIONS NECESSARY TO SECURE LARGE HATCHES AND TO HAVE MINIMUM LOSSES IN YOUNG POULTRY.

By L. H. Baldwin, Deer Park.

I am not responsible for the selection of the programme, and you can see that the title allotted to me covers a good deal of ground. I want to preface my remarks by saying that, in going into a number of precautions, as I must do, I do not wish to appear to frighten anyone with regard to the question of artificial incubation. We have yet to learn a good many things in reference to incubation and yet it is astonishing the wonderful sucess that amateurs have in operating incubators. First, there is the breeding stock from which you secure your eggs to be considered and then there is the care of the eggs from the time they are laid until placed in the incubators, and then the care of the eggs when placed in the incubators. The question of stock may go back a good many generations. We know it has been said "that the sins of the fathers are visited upon the children" and that, I think, is a general rule in nature. If the breeding stock has a tendency to lay eggs that are unfertile, or with weak germs, it is likely that their progeny will have the same defect. It has been suggested that the birds be trap-nested for fertility. By so doing we can strengthen our breeding stock by selection. It is not many years ago when most people kept their hen houses closed up and were inclined to believe that warm hen houses were necessary. That was a mistake and we have found that the open air hen house keeps the flock in the most vigorous condition, a very necessary precaution for securing real good strong fertility in the eggs. You should throw open the windows of your hen house every day. Never mind how cold the weather is, as long as the sun is shining keep your hens exercising in the sunshine. It is the man who is working out in the open air who has the strong vigorous constitution. One thing you must be very careful about is the feeding of your birds. If you feed too heavily they will lay on fat, and will injure your hatching prospects during the next season. After you have got your eggs the hatchability is considerably affected by the temperature to which they are exposed. It has been ascertained that the germ in the egg will incubate at the temperature of about seventy degrees. If the egg has been kept at a temperature of above seventy the germ will slowly incubate. Where we have a temperature in the summer running up to 80 degrees and 90 degrees you can easily understand the damage that is then done. Considerable damage is done to eggs shipped long distances by being placed too close to the stove in the express car. Then they are taken out of the car and cooled for a day or two before being placed in the incubator. On the other hand eggs may be too cold. In the winter time you must be careful to gather your eggs two or three times a day so that they will not be chilled.

Then the question comes of handling the eggs in the incubator, and that is a subject for a whole evening's address. If you have good strong eggs and place them under a hen you are almost certain to get a good hatch. It is an extraordinary thing that an incubator may do well one month and the next month fail entirely. I do not think I will go so far as to say it is entirely the fault of the machine, but there is something in the condition under which these incubators are operated that affect the hatch. Then there is the question of the temperature under which we should run the incubators. I would not advise anybody to run an incubator in any other way than under the directions of the manufacurer. He is supposed to know his incubator.

best. If you do not have the results that you think you are entitled to, then I would begin to experiment on my own account, and one suggestion I would make is to run your temperature a little higher than the ordinary incubator manufacturer directs. I have found that to be an advantage, especially when one comes to deal with the other side of the question, viz., to have the minimum loss in the young poultry. You may have splendid hatches, but if your mortality in the young chicks is considerable after they are hatched every chick that dies is a loss, and takes so much off your profit, and is a great discouragement. I would certainly rather have a comparatively small hatch and a large percentage of the chicks live than to have a large hatch and a high rate of mortality. The Chinese treat their eggs entirely different for the first ten days to the way they do the last, and I believe there is something for us to learn from them in the manner of starting the germs. I think it is most important during the first twenty-four hours. If you have the germ well started in a vigorous condition I think that imparts a characteristic vigor to the chick. Doctor Dorest, in France, made a close study with regard to incubation to find out if he could discover the cause for deformities in chicks. He tried artificial incubation at various temperatures, treated the eggs to all sorts of conditions, gave them shocks from end to end and side to side, and sent them away on railway journeys, and he found that by giving comparatively low temperature at the early part of the hatch, the development being sluggish, a sluggish character was imparted to the chick and it had not a vigorous growth; and I think that is an answer to the question so often asked as to "why so many chicks die in the shell?" Some say it is due to not giving them enough moisture at the end of the hatch. I think the answer is the chicks had not strength enough to kick themselves out and the reason was because there was not vigorous growth at the start.

Q.—Do you run your incubator with the suspended thermometer?

A.—I think every person should run their incubators with two thermometers. Have one suspended by wire from the top of your machine with the bulb of the thermometer half an inch from the top of the eggs. I have what are called veterinary thermometers to place on the top of the eggs. They will record much more accurately than the ordinary incubator thermometer. I think it is best to keep the thermometer on the eggs at 102½ to 103½. I think that 103 is better than the lower temperature. It is well to keep the ventilators closed up during the early part of the hatch, so that there will be no great draught, and I think the open bottom incubator had better be closed up as much as possible. Keep a uniform temperature. The Chinese give their eggs no ventilation whatever except when they take them out of the ovens to cool them. While they are actually in the oven they have no ventilation during the first ten days, and in the last ten days they are right out on open shelves.

Mr. GILBERT: If your germs are strong do you think a few degrees in the incubators makes any difference in the results?

A.—I do not think it does later on in the hatch.

Q.—Why be so particular as to the exact points of temperature. I think there is a great deal of trouble made for the farmer by this kind of work. I think we should get things down as simple as possible so that the boys and girls can run the incubators. My experience, extending now over nearly one-quarter of a century, is that there is more in the germ than there is in the incubator. I have had incubators that were draughty and they hatched out the chicks. I told the maker his incubator was draughty, that

it would hardly hold the heat, and he said, "I made it so as to let wind into it."

Mr. Baldwin: I prefaced my remarks by saying that I did not want the audience to be frightened by the precautions I gave, because a great many amateurs who start out are wonderfully successful.

INVESTIGATIONS DURING 1906.

By W. R. Graham, Manager Poultry Department, O.A.C., Guelph.

As the hour is getting late I do not think it would be wise on my part to give you any detailed account of all the investigations that have been carried on at the College during the last year. In our work of artificial and natural incubation we are hatching chickens practically the year round, beginning in January and ending in the middle of September. We had a number of June and July hatched chickens, and in other years we found it almost impossible to raise them on ground that had been run over by other chickens. This year we were particularly interested in artificial and natural incubation from a scientific standpoint, and we did not care a great deal what became of the chickens after they were hatched, so long as they lived to two weeks of age. We simply dumped them down in a corn-field. We had a cornfield of about twenty-five or thirty acres. The chickens were hatched with incubators and with hens and were brooded entirely by hens. Each hen had about fifteen chickens. The way we got the hen to mother the chickens was by putting a few eggs under her for four or five days, and then at night we would load her up with chickens. Occasionally we would find a hen that did not want the job, and it was peculiar that a black hen would kill the black chickens and a light hen would kill the light chickens. We put an ordinary brood coop out in the corn-field, and put a hopper inside of it, and filled it with wheat and some corn and some dry bread crumbs, and in some we put commercial chick food. These hoppers would hold about a quart. The hen was put in and the chickens with her, and they were left there for two days, and in some cases three days. Then we took the front out of the coop and away they went, and we put one large hopper, that would hold a bagful of wheat, in the centre of a circle of coops and filled the hopper once a week with wheat. We never watered them, and I will tell you why. This cornfield was about half a mile away from the plant and we were not carrying water that far for chickens. If the dew was any good they had it. This cornfield was cultivated, the ground was moist and there was abundance of insects and lots of earth worms.

Q.—Did you have much rain?

A.—Yes, we had rain and dry weather too. I had a man come all the way from the centre of Philadelphia to see these chickens. We had three hundred of them that would average two pounds each, when they were eight weeks old, and chickens that were kept on ground that had been run over by other chickens weighed less than a pound when they were eight weeks old. The chickens that run in the corn-field were fat and plump, and were the best broilers I ever killed either in Canada or the United States, and it

costs less than four cents a pound to raise them. I have here a pair of chickens hatched the first day of August, and that run in that cornfield, and were fed as I have described. When the corn was cut, about the 1st of November, there was a patch of mangels beyond the corn and after the mangels were pulled they came back in the turnips, and when they got through with the turnips they ran up and down the field. They encountered two snow-storms. They roosted in their coops at night. On the first of November we brought in what was left of them; we had been killing them for private buyers. When they were four months of age they weighed about five pounds each. Here is a pair of chickens four months old that weighed five pounds each. They were fed in a crate for a while before they were killed. I want to impress upon you the necessity of putting chickens on ground that has not been run over by other chickens the year before.

THE CULTIVATED BARLEYS.

By J. Buchanan, Lecturer in Field Husbandry, O.A.C., Guelph.

For many years we farmers have discussed the growing and marketing of all classes of farm crops, from a "practical" standpoint, and have inclined to make light of what is called theory or science in regard to farming. Most assuredly it is wise to take a good practical sensible view of all matters pertaining to our chosen occupation but it is high time we were awakening to a knowledge of the fact that science is not, as many of us have thought, impractical theory fit only for Professors of Colleges, but that it is in large measure simple, practical, common sense. As soon as we can bring ourselves to know that science is not complex knowledge, beyond the reach of ordinary men, but that it is simply knowledge systematized or placed in good order, and therefore simplified, we will be in a fair way towards making progress more rapidly than we have done in the past. If we learn to systematize our knowledge as we systematize our work, we will soon find that in many parts it is incomplete, and will therefore seek to make it more complete by observation and by reading. The degree of our success in farming will depend largely on the degree of our knowledge, and only when we have complete knowledge can we hope to meet with perfect success.

I propose to speak for a short time this morning on the classification, relationship, and practical value of the various kinds of barley grown in different parts of the world, in the hope of arousing a greater interest in the study of farm crops in general by showing that there is much to be learned about even such a common crop as barley.

In speaking of barley we usually think of it as being divided into two varieties; viz., Six-rowed and Two-rowed: sometimes we include a third variety, known as Four-rowed. These terms refer, of course, to the number of rows of seeds in the ripened heads of the different varieties, or, as they are more correctly called, classes. In reality there are only two great classes, since there is no true four-rowed barley. For convenience and clearness I have prepared the accompanying chart to show a fairly complete classification of all cultivated varieties.

Six-rowed	Common Six-rowed	Bearded	Hulled	White (1)
				Black (2)
			Hulless	White (3)
				Black (4)
		Beardless	Hulled	—White (5)
			Hulless	—White (6)
	True Six-rowed	Bearded	—Hulled	—White (7)
Two-rowed	Erect heads	—Bearded	—Hulled	—White (8)
	Nodding heads	—Bearded	Hulled	—White (9)
			Hulless	—White (10)

I have also placed on the table, specimens of the ripe heads and samples of the threshed seed of the various types belonging to the two great classes or groups. These you may examine more closely at your leisure.

On looking over the chart you will notice that the two groups are divided and subdivided until there are ultimately ten distinct classes. Classes 1, 5, 8, and 9 are each made up of a number of more or less distinct varieties, differing in length or strength of straw, amount or quality of seed produced, time of maturing, etc. In the remaining classes there are but few varieties.

While some kinds of barley produce heads with six rows of seeds and others produce heads with only two rows. it is none the less true that all sorts have six rows of *flowers* on the head. In the six-rowed kinds all the flowers are perfect and all produce seeds, while in the two-rowed varieties the two outer rows of flowers on each side of the head are barren and only the flowers of the central row on each side are capable of developing seeds, hence the two rows of seeds on the ripened heads.

I have already referred to a kind of barley known as four-rowed. The term four-rowed is not often used in Ontario, but we frequently hear of this kind of barley being grown in Great Britain, where it is more frequently called Bere or Big. In reality it is the ordinary six-rowed type grown in Ontario, of which some of our most common varieties are "Mandscheuri," "Oderbrucker," and "Common Six-rowed" (Class No. 1 on chart). Varieties of this type are sometimes said to be four-rowed because the outside rows on the two sides of the head frequently overlap to such an extent as to give the appearance of being one, and the head therefore appears to have four rows rather than six. In this class of barleys the heads are always more or less flattened and the seeds of the two outer rows on each side of the head are smaller than those of the central row and are often slightly twisted in appearance. The chart shows that in the six-rowed group we have both hulless and beardless varieties. In general it may be said that the hulless varieties lack strength of straw, but the grain, owing to the absence of hulls, weighs about sixty pounds per bushel. The beardless kinds usually possess a fair strength of straw, but are comparatively poor yielders, and therefore cannot be highly recommended to Ontario farmers. No doubt many growers would be glad to dispense with the beards if they could do so without also sacrificing the heavy yield.

The *true six-rowed* type of barley, referred to in the chart, is practically unknown in America. In this class the heads are not at all flattened and have six rows of seeds uniformly developed, giving the head a perfect star shape when viewed from above. We know little of its practical value in Ontario as yet, since we have not yet had time to give it a thorough test at the experiment station. I may say, however, that it produces short, strong, straw and large heads and has a good appearance when growing.

Among the two-rowed varieties there are two very distinct types, and these differ widely in use as well as in appearance. The varieties belonging to the first of the two-rowed types, referred to on the chart, possess stronger straw than any other kind of barley that has been tested on our trial grounds. They also produce short, compact, erect heads and large plump seeds of uniform shape and appearance. This is commonly known as the duckbill type of barley, and the "Duckbill" and "Canadian Two-rowed" are two of the leading varieties of the type. As a rule they do not produce quite such a large yield as the best six-rowed varieties, but the grain has a better appearance and, owing to the uniform size and shape of the seeds, they germinate much more evenly and are therefore better suited for malting purposes than are the seeds of six-rowed kinds.

The varieties belonging to the second type of two-rowed barley, often referred to as the Chevalier type, have very long, slender, drooping heads and exceedingly weak straw and are very difficult to harvest because they almost invariably lodge badly before ready to cut. It may be said on their behalf, however, that they excel all other kinds in the production of malting barley, as the seed is uniform in size and shape, giving even germination and has a high starch and low protein content which makes it especially suitable for malting. Varieties of this type are grown almost exclusively for malting purposes in England and an attempt has been made to have them more widely cultivated in Canada to supply the English brewers, but the effort has met with little success, owing to the fact that the crop lodges so badly and does not produce such a large yield of grain as the six-rowed varieties.

If there are any questions you wish to ask before I resume my seat I will be pleased to answer them to the best of my ability.

Q. Are there any distinguishing characteristics between the Mandscheuri and Mensury varieties?

A. Our experiments have shown a considerable difference in yield, and some difference in the vigor of the plants, but I have not observed any structural difference which could be taken as a constant distinguishing feature.

Q.—Was not that difference due to a longer period of selection?

A.—We have had the two varieties under test for the same length of time and both have been treated in exactly the same way.

Q.—How does No. 21 compare with the others?

A.—Possibly some of you do not know what No. 21 is. It is a new strain of Mandscheuri barley, originated at the College by a system of very careful plant selection. The parent plant of this strain was selected as one of the very best from a plot of 2,700 plants grown under uniform conditions. It has not yet proven to be superior to the original Mandscheuri in yield, but has stronger straw and a much finer appearance when growing.

Q.—Has the strength of straw been characteristic right through from the start in favor of No. 21?

A.—Yes it has in our experience and all of the farmers who tested the

two varieties side by side during the past summer reported in favor of No. 21 in this respect.

Q.—I gather from what you say that you are working along the line of feed barleys; you are not doing much for malting?

A.—Not at present.

Q.—Is there any likelihood of our developing a trade in export barley for malting?

A.—We are trying in our selection work to get a strain of the Chevalier barley (that is the malting barley) that will be stronger in the straw. We have done the same kind of selection work with the Chevalier as we have with the Mandscheuri, for the purposes of getting a stronger straw, but we have not succeeded in getting a good one yet. We are crossing the Chevalier with the Duckbilled class to try and get the strength of straw. If we can get a malting barley strong in the straw, then we will have good malting barley and possibly might be able to offer barley which would be satisfactory to the English brewers.

Q.—Do you really think it worth our while to pay much attention to that?

A.—Of course we want to reach out in all possible lines, but our barley is used chiefly for feeding purposes and I am not certain that it would be of great value to the Province to develop a market in the Old Country for barley.

Q.—It just occurs to me that we may complicate this question and spoil what might make a first class article for our own use?

A.—That is worth considering in our work.

POINTS TO BE CONSIDERED IN SELECTING AN EAR OF CORN FOR SEED.

By L. S. Klinck, Macdonald College, Ste. Anne de Bellevue, Que.

I offer no apology this morning for speaking on the topic assigned me. I believe the subject of producing seed corn in Ontario is a live one. The fact that there is a difference of opinion on this point may, for the time being, add to the interest, but primarily this interest has been awakened and sustained by a pressing need. To throw some light on this problem, looking towards its solution, is the purpose of this address.

Can Ontario produce her own seed corn? If she cannot, my talk this morning will be of interest to few; if she can, it should be of interest to all. From what I have been able to learn from carefully conducted field tests, and from corn growers who have been successful in producing their own seed corn for years. I believe she can. I have reference now chiefly to Ontario's corn-belt,—a district, so far as commercial seed corn production is concerned, practically embraced in the Counties of Essex, Kent and Elgin.

This year for our corn work in Ste. Anne de Bellevue we obtained seed corn from thirteen growers in these counties and, notwithstanding the fact that we had a cold backward spring, the corn averaged 90 per cent. germination in the field. The man who has made careful field germination tests will be the one who will most appreciate these results.

The sweet corn on the table before me was grown at the Macdonald College this past season, and yielded at the rate of 106 bushels per acre of thoroughly dried seed-corn. The only fertilizer used was a light application

of barn-yard manure in the spring. Seed of the flint corn to my right was obtained in the Eastern Townships, Quebec, and planted at Ste. Anne's. Although it was not planted until the 6th of June, it was perfectly matured three weeks before the frosts were sufficiently severe to injure the foliage. This plot was one quarter of an acre in size, received no artificial fertilizer or manure and yielded at the rate of 65.9 bushels of shelled corn per acre. Undoubtedly we have yet much to learn regarding varieties, cultivation and handling of this important crop, but by co-operating with nature my fears for ultimate success are not grave.

Consciously and unconsciously corn has been selected in a crude way for centuries. The fact that in harvesting the crop it was necessary to handle each ear separately made the selection of the largest and most symmetrical ears a comparatively easy matter. It is true that by this method performance and real efficiency were often sacrificed to good appearance, as is too often the case at the present time. An ear possessing outward character and strength and approaching perfection so far as conformation goes need not necessarily be a productive or a desirable ear to plant. If, in addition to a good external appearance, the individual kernels are of the desired conformation we can more nearly determine the true efficiency of the ear so far as feeding value is concerned, but it is only by a comparative field test of different ears that we are able to determine the prepotency or projected efficiency of any ear.

Realizing the wide range of varieties and types of corn grown in Ontario, I shall not specialize too closely, but hope to direct your attention to some fundamental points to be considered in selecting a good seed ear.

Conformity to Breed Type. All ears intended for seed purposes should conform to the desired standard in shape of ear and kernel, in colour of grain and cob, in purity, size, uniformity, filling of butts and tips, indentation of crown (in the case of dents), depth of kernel, space between rows, straightness of rows and proportion of corn to cob. Conformity to a desirable type should be insisted on, as it has been repeatedly demonstrated that pure bred varieties give not only higher yields but corn of better quality than that produced by nondescript breeding.

While this is true, broadly speaking, it must ever be borne in mind that it is unwise to pay such close attention to detailed evidences of good breeding that real efficiency is neglected or overlooked. Again, no variety of corn, no matter how productive it may be, can ever hope to win public favour and become widely known if it attempts to justify its existence on the grounds of productiveness alone. However prone we may be to overlook the æsthetic side of grain production and lay emphasis on the financial results, somehow we all insist that an ear of corn has those evidences of breeding which give such added interest and satisfaction in growing and handling the crop. Efficiency and conformity to a fixed type are not antagonistic.

Shape of Ear. The shapes of ears will vary from the cylindrical to long pointed forms according to variety and the conditions under which they have been grown. Ears full and strong in the central portion are most desirable as they indicate a high per cent. of corn to cob and corn of superior feeding qualities. An ear properly proportioned in the centre is indicative of strong constitution and high yield, as a correlation exists between ears and the kernels of which they are composed.

Shape of Kernel. A good kernel, especially in the dent corns, should be broadly wedge-shaped, strong and plump at the tip and should carry its sides well up to the crown giving a strong full shoulder. The germ or chit should not only have a large surface but should be carried well down to the

back of the grain. The germ is high in oil; the hard horny part of the kernel is rich in protein.

In selecting an ear of corn for seed always remove two or three kernels and study them in connection with the ear. If the kernels are undesirable reject the entire ear even if to outward appearances the ear is good. Many a poor ear is used for seed or show purposes which would never have been considered had the owner removed a few of the kernels and made a careful study of them before making his final selection.

Butt. The butt should be symmetrical, full and strong and made up of straight rows composed of kernels conforming as closely as possible to those in the centre of the ear. A full rounded butt is indicative of strength and adds the element of character to an ear but it is not desirable to have it round out too fully and become too constricted as there is a danger of its weakening the shank to such an extent that the ears break off prematurely. Open or swelled butts are always objectionable.

Tip. The tip should be in proportion with the body of the ear and round out symmetrically and naturally. The rows should be straight and kernels retain as nearly as possible the size, shape and indentation of those in the centre of the ear. Too much attention should not be paid to the complete covering of the tip, as the kernels here are not so valuable for seed or for feed as those in the centre of the ear. In addition to this, when undue attention is directed to securing ears well filled out at the tip there is danger of doing so at the expense of shortening the ear in the most valuable part.

Purity of Colour in Grain and Cob. Strict adherence to a uniform colour is essential in maintaining purity or freedom from mixture in any variety. The degree or depth of colour in kernels or cob is of minor importance when compared with the question of mixture. Corn intended for seed should not be planted within a quarter of a mile of another variety of corn. Even if all the kernels not true to colour are removed from an ear there is a strong probability that many kernels on the same ear, although apparently pure, are in reality of a different origin. Xenia, or the direct effect of pollen on the solks is not always shown in the colour of the endosperm, but may be confined to the embryo. This being the case it is not good practice to plant for seed any ear having many mixed kernels even if all the kernels not true to colour have been removed as the influence of the previous cross pollination may at any time manifest itself in subsequent generations. White corn should have white cobs; yellow corn should have red cobs.

Uniformity of Kernels. Under this heading is considered not only the uniformity of the kernels on the ear but also the conformity of the ear and its kernels with the rest of the sample. As the kernels on the butt and tip of an ear cannot conform closely to those in the centre they are shelled off when a uniform sample is desired for seed. Blocky or irregular kernels in the central portion of an ear are considered much more objectionable than if they were found at the ends, as it is much more difficult to remove them.

Uniformity in size and shape of kernels is very important, especially when a planter is used, as a lack of uniformity renders it impossible for any planter to drop the desired number of kernels to the hill.

Vitality. As used in this address, the work vitality is not restricted to a kernels ability to or lack of ability to germinate, but is used in the wider sense to indicate its strength and probable reproducing power when it does grow. A kernel full and plump in the tip and having a bright vigorous germ is most desirable. Kernels weak and pointed at the tip do not have a sufficient store of reserve food to give the tiny plant a strong start in life. All such kernels should be discarded.

No point in seed selection requires greater care and the exercise of more accurate, painstaking judgment than that of rightly estimating the relative discount that should be made for different evidences of immaturity, or for signs of injurious effects resulting from improper storage. In many cases the only way to make even an approximate estimation of the germinating power of any sample is to make an actual germination test.

In order to determine the relative value of the different types of immature kernels so frequently found in selecting seed corn, germination tests were conducted by the writer in the field and in the greenhouse. Five classes were experimented with and the conclusions drawn from the results form the basis for the statements regarding each class.

Chaff or Cob adhering to Tip of Kernel. It was found that chaff adhering to a kernel, as it often does in immature ears, was not sufficiently detrimental to warrant discarding such kernels, providing this was the only evidence of immaturity, as the growth of these kernels, both in the field and in the greenhouse, was satisfactory.

Black Tips. Kernels with the tip cap removed exposing the black covering of the embryo grew well when planted in the greenhouse and under field conditions gave a good stand. The tip cap is intended as a protection for the young plant and when removed the water readily enters. If planted in a cold wet time such kernels frequently rot, but when planted under favourable soil and climatic conditions give but little indication of impaired vitality. These statements apply only to those kernels in which the tip cap remained in the cob on shelling. The black skin-like covering immediately under the tip cap is natural to every kernel. Objection can be taken to its appearance only when it is exposed through removal of the tip-cap in the process of shelling.

Wrinkled, Blistered or Shrunken Germs. Kernels showing these evidences of immaturity are arranged in the order in which objection should be taken to them. Corn stored in a very warm place will shrivel and become uneven on the surface, just as an apple, when left in a warm room, shrinks irregularly from its outer covering leaving ridges and depressions. Unevenness on the surface of germs due to this cause should not be regarded as objectionable, but a shrunken or blistered germ is very serious if the covering of the germ is raised to any considerable extent as a result of exposure or freezing. The vitality of such germs is almost invariably greatly impaired, if not wholly destroyed.

Starchy, Shrunken or Blistered Backs. Whenever exposure or freezing has been severe enough to blister the back of a kernel its chances for germination are poor. This is one of the strongest indications of injury resulting from imperfect ripening. When the back of a tip shows a decided depression it is strong evidence that the kernel has not had sufficient time to develop properly. A kernel depressed on the back is usually deficient in the hard, horny, glutinous material and is therefore composed largely of starch.

Condition of germ as indicated by its cutting qualities. A properly developed and carefully dried germ cuts readily and presents an oily appearance. It is light cream in colour and can be cut in very thin layers, which roll up like fine shavings. If kiln dried, less oil will be apparent and in cutting the layers will break up readily. A frozen germ, on the other hand, lacks this healthy oily appearance. It is tough and elastic and unless the knife is sharp the germ is sure to shove or roll. When cut it presents a dark, glistening, soggy appearance.

Size of Ear. The length and circumference of the ears chosen must be governed by the locality in which the corn is grown. The tendency has been, and still is, in the direction of growing varieties too large to mature properly. This is a mistake. It will prove more profitable to grow a smaller corn which will mature every year than to grow a large corn which seldom if ever ripens properly.

In dent corns the proportion of length to circumference should be as four is to three, *i.e.*, an ear ten inches long should measure seven inches in circumference about three and one-half inches from the butt. Short thick set ears are inclined to have long deep-set kernels which makes it impossible for the ears to dry out readily in the fall unless the variety has been carefully selected for years to combine early maturity with depth of kernel. It is, of course, advisable to grow as large and deep-grained a variety as can be safely depended upon to mature in any given locality.

In flint varieties the length of the ears differ so widely that it is a more difficult matter to establish a fair proportion. As a general rule the production of long pointed ears should be discouraged as they are almost invariably poorly covered at the tip.

Space between Rows. Wide space is undesirable in any but deep-grained varieties. It is generally caused by rounding of the crowns. As there is no good reason why the kernel should not carry its sides squarely up to the shoulder and thus fill practically all the space with corn, wide spaces are severely cut. In addition to the serious loss occasioned by this conformation the chief ground for objection to them is that they are an indication of degeneracy or reversion to a more primitive type.

In some varieties like Reid's Yellow Dent, the rows are frequently paired, the inner sides of the rows forming the pairs dovetailing,—the outer sides being carried up straight to the crown giving a square blocky shoulder. In the deeper grained varieties the rows are seldom paired and the furrows are much wider. This is a wise provision of Nature, making it possible for the deep-grained corns to dry out more readily. Flint varieties are grown where the season is short. Naturally the amount of space between the rows is great and the kernels flinty and rounding on the crown.

While open rows are objectionable, rows having too little space are fully as undesirable. A certain amount of space is necessary for maturing the kernels. If this space is too limited the kernels almost invariably show wide space between the kernels at the cob, and as the tip is the most valuable part, the importance of having it full and well developed is apparent. The presence of those wide spaces between the kernels accounts for the fact that so many close rowed ears are so light in weight and shell out such a low percentage of corn.

Proportion of Corn to Cob. It is practically impossible to lay down a standard on this point which will apply to any considerable section. Dent varieties will range from 78 to 86% shelled corn; flint varieties will range from 74 to 81%. A good average for the former would be 83%; for the latter 79%. As it does not necessarily follow that a large ear will shell out more than a much smaller one, in selecting seed corn close attention should be paid to the points just mentioned which go to make up a solid ear. To ascertain the proportion of corn to cob: weigh the entire ear; shell the ear and find the weight of the grain; divided the weight of grain by the weight of grain and cob, and the result will be the percentage of corn.

A large proportion of corn grown averages considerably less than the average given, a number of varieties, as the result of years of careful breeding, exceed the average percentage. While it is desirable to grow corn giv

ing a low per cent. of the cob there is a point beyond which it is not safe to go. There seems to be a proper proportion or relation existing between the corn, and the cob bearing it, and beyond this point the breeder cannot go without seriously endangering the vigor and constitution of his corn.

GLEANINGS FROM FIELD WORK IN ONTARIO DURING THE PAST SUMMER.

By T. G. Raynor, Seed Branch, Department of Agriculture, Ottawa.

I want to call attention to a feature of our exhibit which is educational, and I would like to know why some such system as we have for showing the grains should not be used by Agricultural Societies. It would simplify the work and make it easier for the judge and the people. Another feature that we have in our exhibition is boxes in which grain has been sown, such as barley, wheat and peas. It illustrates the different kinds of seed sown; some plump seed, small seed, shrunken seed, and broken seed; and in the case of peas weavily seed, showing the advantage of careful selection of seeds.

It has been my opportunity to visit a number of farms where they have improved their grain by hand selection. One man is doing this with Red Fife wheat. The year before last he had about ten acres of improved seed, the product of hand selected seed that he had been growing according to the plan laid down by the Canadian Seed Growers' Association. At the time of my visit just before harvest I would say it was easily good for twenty-five bushels to the acre. I have since found out that it has yielded a little more than that. That man was offered by his neighbors one dollar and fifty cents ($1.50) a bushel for that seed, but he would not take it. I asked him why, and he said because last year his seed was badly smutted. He had been following up selecting seed for five or six years. He had taken out some stable manure and put it on a piece of his improved seed plot, and right there you could see where every drop of that stable manure had been scattered; and the reason of that was that it had held the moisture, and you could see right to the mark where the timothy left off and the pea stubble began.

Q.—Was this manure put on top?

A.—Yes, taken out after the crop had been sown and scattered over the surface and then allowed to remain there. It was fine manure, the sweepings and scrapings of the yard.

I also visited a crop of oats, two acres of as uniform and even lot of oats as I have ever had the privilege to see. It would yield about seventy-five bushels to the acre, and he told me he had noticed a visible improvement since he had been selecting his seed.

Another gentleman in the vicinity of Ottawa who has improved the Banner oats had about four acres that lay right along the roadside, and it was remarked by all who passed what an even piece that was, and certainly it was just almost as level as the table for the whole four acres and the yield would be about sixty bushels to the acre.

Another gentleman has been improving the Red Fife wheat. He has been following up the work for six years, and he feels it has paid him well.

Another man has been improving Compton's Early corn, and it has shown marked improvement. He bought some seed and grew alongside of his selected seed, and the seed he bought from the dealer had the best chance

so far as cultivation was concerned and has an application of stable manure; but the crop from his own select seed of the year previous was standing up two or three inches higher than the other. They were both planted at the same time.

I visited another corn plot, and the farmer told me a heavy rain came up when it was half planted, and the other half was planted three or four days after, and you could see to the mark right where he left off planting. The growth was three of four inches higher, and he said there was a far greater yield on that which he had planted previous to that heavy rain storm as compared to what was planted a little later.

Another corn plot in the same vicinity was easily 10, 11 and 12 ft high, but the striking feature of that crop was that it had a large amount of smut present all through it.

Another corn experimenter who had been selecting corn all his life could scarcely be convinced that he could make a selection from the best ears. This year he selected from the best ears out of the whole bunch, enough to plant eight rows, and he planted these right alongside of the others, and he said he could scarcely believe his eyes when he saw the improvement in these eight rows.

Another plot of sweet corn it certainly was a sight to see. It was as even as could be and a rank vigorous growth; nearly every hill was in its place, and it gave promise of a very large yield showing the great advantage of selecting the seed.

These are some of the principal things that I noticed in my trip of inspection that I thought would be of interest to you. If they are worth knowing I am very glad to have had this opportunity of placing them before you.

HOW THE RECORDS OF THE CANADIAN SEED GROWERS' ASSOCIATION ARE KEPT, THEIR UTILITY AND PURPOSE.

By L. H. Newman, Sec'y. C.S.G.A., Ottawa.

During the following sessions of this Fair we will doubtless hear of the breeding of live stock, the principles of which are now coming to be pretty well understood. With this growing knowledge of these principles there has come a corresponding improvement in the various breeds of live stock to which they have been applied. Breeders of live stock have recognized in a general way for generations the importance of breeding from specially desirable parents. This is simply a recognition of the fundamental law in breeding that "Like produces like." This is also the basis of pedigree, which is merely a record of ancestry, be it good or bad. It is because men expect a good animal *from* a good animal that they wish to know the sire and dam, the grandsire and granddam, etc.; hence a genealogical record is kept of the descendants which have sprung from a certain individual of marked superiority and which was taken as the starting point. Unfortunately, however, the descendants do not always maintain the excellence of their ancestors. They may have been neglected and poorly fed, which has resulted in loss of vigor and quality. In plant life we would say that the strain had "run out." It is therefore apparent that pedigree in animals is by no means a proof of merit, unless the individuals composing the ancestry were all superior animals, which as we have noticed is not

always the case. Hence it is essential that individual merit be looked for as well.

The term "pure-bred" is applied to animals to denote purity of breeding. Pedigrees in its broader sense, however, does not necessarily denote purity of blood, since grade animals may also have pedigrees. Such pedigrees, however, are in practice seldom kept unless they denote utility, as when records, say of the capacity for milk giving, are kept by private owners of grade herds. Pedigrees are now generally kept in some public record commonly known as a "herd-book" or "stud-book." The main objects in keeping public records are: (1) To preserve the purity of the breed and to furnish the breeder with a guarantee of purity of breeding. (2) To guard against the private issuing of manufactured records by designing breeders. In public records no fact can be stated that is inconsistent with what is already recorded. (3) To furnish a ready means of tracing pedigrees.

Let us now turn to the plant kingdom and see how far these principles may apply. At the present time we have a great many different classes of farm crops, and of these we have an endless number of different varieties. Whence came all these varied forms? What are the methods employed in securing them? Practical gardeners, farmers and stockmen know that Darwin discussed facts and principles vitally related to every day farming. This great scientist, whose work has become the basis for all similar lines of work, showed how breeds and varieties originate and change from one to another. The changes which occur in plants and animals in their wild state are due to the "struggle for existence" and the "survival of the fittest." When our plants were brought under cultivation by man, and when our animals became domesticated, the former rapidly subdivided into many forms which we for convenience term varieties, while the latter subdivided into breeds. The different varieties and different breeds which now exist have been gradually developed by the accumulative power of man's selection to suit the different conditions in which they are asked to live. The success with which the process of selection has been applied by man in making his breeds of animals is well known. Selection acts only by the accumulation of very slight variations—the process is cumulative and man's power in accumulating may be said to make the wool of one sheep good for carpets and another for cloth; one beet good for the manufacture of sugar and the other for feeding purposes. While the process of selection, both natural and artificial, is largely accountable for the great diversity of forms both in plant and animal life yet there are times when the desired result cannot be obtained by simple selection. Then it is that in plant improvement hybridizing is resorted to as a means of obtaining the desired end, which is a new variety.

There is a fundamental difference, however, between plant and animal breeding which it would be well to notice. In animal breeding the production of new races is very rare. Ordinarily the improvement sought in animals is improvement in size, quality of beef, milk production, etc., which is accomplished by means of judicious mating followed by careful selection and handling. Plant breeding on the other hand, as *generally* understood, consists in the production of *new* varieties which correspond in degree of difference to the different breeds of cattle. The plant breeder handles thousands of individuals where the animal breeder handles tens, and while the farmer cannot register individuals as does the latter, yet he does name groups or strains. In plants, therefore, the basis of improvement is generally a *group*, while in animals it is a *single individual*. In both cases, improvement is governed by the same natural laws, and the improved strains

of plants must likewise have had their origin in some remote individual or group.

In animal breeding the presence of two separate individuals, the sire and dam, are necessary before offspring can be produced. In plants such as wheat and oats, on the other hand, the sire and dam, so to speak, are included in the one head, and perform their natural functions there, which act results in the production of offspring, which is known as "seed." Hence each plant may reproduce itself in season and independent of outside aid. Where one plant is crossed upon another it is done simply with a view to developing a new race or variety combining the good qualities of the parents. The act of hybridizing breaks up the type, causing many hybrids of different types, and making it possible to finally select the type for which we are seeking. Fortunately, much improvement may be made *within* the race without hybridizing by simply selecting the most coveted plants—those plants which show themselves to be most capable of thriving to best advantage under their respective conditions. Hence, since the male and female are to be found in the one plant, we can breed up our plants by selecting for seed purposes seed from those plants which we consider most suitable as parents.

In the past it has been the custom to secure our seed from the bin, and screen or fan it out, taking the largest kernels for seed purposes, giving no thought to the plant which produced it. In other words the individual has been considered while the pedigree has been ignored. Since the same laws prevail in plant life as are taken into account in animal life, it is just as important that both pedigree and individuality be considered here if we would realize best results. Many instances might be given to show the degree to which we may be deceived by appearances. That a grain of wheat or an ear of corn is very often not "what it seems" is too true, and this fact demands that we go a step further and give some thought to the ancestry or pedigree.

This is a problem which the Canadian Seed Growers' Association is endeavoring to solve. Not only does this organization aim to direct the work of plant improvement or plant "breeding," as we shall term it, along approved and scientific lines, but it also aims to keep a record of the performance and purity of the different strains worked with from year to year. The practice of pedigreeing is found to stimulate care not only in the growing but in preventing the mixing of varieties. The importance of the latter is well known to all grain growers. If a pedigree is to be of any use it must represent, first, purity, and second, utility. In animals the ordinary pedigree simply represents lineage or ancestry, while in plants we aim to make it represent both ancestry and utility. It is well known that all crops, or the different varieties of any crop, are not capable of being improved to the same extent. Some varieties are particularly adapted to certain conditions of soil and climate and do not readily adapt themselves to new conditions; while, of course, we are well aware that other varieties seem much more ready to fit themselves to such changes. When careful records are kept of the behaviour of a variety under certain conditions for a few years, and believing that all plants are amenable to the laws of heredity, and that they will reproduce themselves true to type when grown under similar conditions of soil, climate, etc., the real value of a race or strain can be determined pretty closely.

The very complete information which it is necessary to have in order that the records may be of value necessitates a great amount of work. The system by which this information is obtained is briefly as follows: After a

member of the Association has been well started in the work, and has received all necessary direction from headquarters, he is sent suitable forms to use in recording the performance of the variety with which he is operating. The first form is sent early in the year, and is used to enable him to record certain notes which are to be taken on his breeding plot during the growing season. He is asked to give the following information, viz.: (1) Date of seeding. (2) Amount of seed sown. (3) Per cent. of smut and rust in the resulting crop on the plot. (4) Character of plants. (5) Date when crop becomes fully mature. (6) Date of choosing plants and selecting large heads therefrom. With crops such as corn and potatoes, suitable information is also called for. Later in the year another form called the "Record Form" is sent to all members, in which they record the weight of cleaned seed secured from the hand selected plants; the size of the hand selected seed plot and total yield of that plot; the weight of grain per measured bushel of the crop produced from the improved seed plot; the freedom from other varieties; character of soil on the plot, nature of preceeding crop, and freedom from weeds. During the first few years the actual work of the member is also inspected during the growing season and careful notes taken not only on the nature of the crops and soil, the percentage of rust and smut, the vigor of growth, the method of seeding, weediness, etc., but on the general appearance and condition of the farm as well. The report of the inspector is checked against that of the member, and every opportunity is taken to avoid errors or misrepresentations. Samples of the heads and grain are also sent in and examined carefully, and anything of importance is noted. All information obtained from these sources is recorded in the "Record book" year after year, and in course of time, when results come to warrant it, pedigrees are issued for the seed. According to the constitution of the Association no pedigrees can be issued in any case until the seed has been grown according to regulations for three successive years at least. Since the standards must necessarily be approximate on account of the immense territory covered, the conditions peculiar to the respective districts are carefully considered before issuing any certificates and creditable results with the strain for the locality concerned must be secured for a series of years.

Pedigrees, or as they are called in Association terms "Certificates of Registration," are issued in three classes, viz.: First, for that seed which has been selected by hand from standing plants for a series of years, each certificate representing 10 lbs.; secondly, for the threshed and cleaned seed produced on the hand-selected seed plot, each certificate in this case representing 50 lbs.; and thirdly for the threshed and cleaned seed produced on the improved or multiplying plot. This last is called "General Crop Seed," and is the seed which is used most largely in commerce, each certificate representing 100 lbs. These certificates, to which the name of the secretary must be attached, certify that the seed for which they are issued has been grown and selected according to the rules of the Association for a given number of years, and that it has been accepted for registry in the records of the Association. On the back of each certificate is given the grower's certificate, and the statement of transfer, which is filled out by him before it is transferred to a purchaser of the seed.

While the utility of these certificates has not yet been fully demonstrated, we believe that their use will stimulate to greater care and honesty. We now have not only too much renaming of varieties, but too many common place introductions. Some of these may do exceedingly well under certain conditions, the reports of which success stirs up the all too prevalent

variety craze. When given a trial, however, the great majority of these so-called "wonders" prove disappointments, and in the meantime much money has been spent and lost. Better by far to realize good, steady, average crops than spasmodic flights into the realms of perfection one year and into the depths of failure and despair the next.

A strong organization with power to discriminate and keep in check aggressors in this field has a powerful whip to prevent breeders, seedsmen, and nursery men from going to extremes. In order that this organization be able to render the greatest public service it is necessary that the people themselves come to know something of the laws which underlie the origin of varieties, and plant improvement, and that they will grapple with the problem themselves under the intelligent direction which the Association aims to give.

THE DUAL-PURPOSE COW.

By E. C. Drury, B.S.A., Crown Hill.

The dual-purpose cow has been the subject of much debate. On the one hand the special purpose dairy cow advocates have asserted that she is no good for milk, and on the other the beef men deny that she can produce a good quality of beef. Between these two sets of men, each certain of their position, the advocates of the dual-purpose cattle have had a hard time of it. Therefore I feel somewhat nervous about introducing the subject.

In beginning, I desire it to be distinctly understood that I have no quarrel with the special-purpose cow. We do not expect the dual-purpose cow to equal the record of her dairy sister, nor to give quite as fine a carcase of beef as the beef type animal. To do so would be absurd. We do, however, expect her to give a fair profit at the pail, and at the same time to produce calves that can be made into good beef profitably. We admit that the dual-purpose type is not the type for all circumstances, but we claim that for her own circumstances she is a more profitable cow than either of the special types.

The relative cheapness of land and labor has much to do with the type of cattle that is suitable for any particular farm. We have three conditions, in the main, though there are many gradations between them. The first is where we find land scarcer than labor—comparatively small farms with an abundance of help, often supplied by members of the family. Here it is important that stock shall be kept that will give the greatest return per acre of the land used to support them. I believe dairymen are right when they claim that the special dairy cow will do this better than any other type. On the other hand, we have such country as the ranching country in the Northwest, where land and feed count for very little, and labor is the expensive item. Under these circumstances we would expect the special beef type, requiring as she does, no labor for milking, to be the one best suited to the situation. But, between these two extremes there is a great deal of country not suited to either of the special-purpose cattle referred to, land which is too high-priced for ranching, and where labor is

too scarce to handle the whole stock of cattle as dairy cows. A great deal of Western Ontario is of this character. We cannot profitably follow range methods, nor have we the labor necessary to keeping our entire stock of cattle as dairy cows. Under these circumstances it would seem to be indicated that a cow giving a reasonable profit at the pail, and at the same time yielding a calf that can be profitably turned into beef, would be the one best suited to our conditions. And, as a matter of fact, what kind of cattle do we find on these farms throughout Western Ontario? What but the dual-purpose type, or as near an approach to it as the knowledge and opportunities of the farmers permit. We talk of the special-purpose beef animal. Will anyone tell me how largely she figures in the production of the beef of our Province? Our stockers, our feeders, our finished exporters, are the progeny of dual-purpose cows, of cows kept for profit at the milk pail, as well as to raise a calf. Whatever her opponents may say, the dual-purpose cow is here, and here to stay, and it behoves us to make the best of her.

What is the best breed to use for the production of dual-purpose cows? To my mind there is only one breed for this purpose,—the Shorthorns, a breed that, while attaining the highest excellence as producers of beef, have at the same time retained their milking qualities to a very large extent. The Shorthorns have now their place in the world largely because of their dual-purpose characteristics, and they stand pre-eminent in this regard. So I would say, if we would have dual-purpose cattle of the right type, we must use Shorthorns, or Shorthorn grades. But just here a serious difficulty confronts the farmer, in the inability to secure sires of the right type. Our breeders of pure-bred Shorthorns have been in many cases, so carried away by the desire for show-ring honors in the special beef types, that they have entirely neglected the milk-producing characteristics of their cattle. The result has been in many cases the production of an animal just as far away from practical utility as is a pouter pigeon. That seems a strong statement to make, but it is true. I have seen in the stables of importers of Shorthorn cattle cows that were dry at eight weeks after calving, their calves being reared by nurse cows. I say such an animal is no good at all. The function of a cow is not only to produce a calf, but to rear him, and a cow without milking characteristics does not do this. But the breeding of animals of this type has had a very bad influence, on the dual-purpose grade Shorthorns of the country. Because farmers have found from experience, that the heifers obtained from bulls of the extreme beef type of Shorthorns, are poor producers of milk, they have been led into several mistakes. In the first place, not knowing what to look for in a heifer for milk-production, and finding the extreme beef type poor at the pail, they have selected heifers as far away from the beef type as possible, thus injuring their herd's beef-producing qualities, and not always obtaining milk-production. Another and worse practice has been the introduction of dairy blood on the side of the sire. This may give some improvement in milking qualities, but utterly destroys beefing qualities.

The best future of the beef industry in Ontario, to my mind, will be found in an intelligent selection by the farmers of heifers that show qualities of merit in both directions: the good strong back, and thriftiness of the beef animal, and the good udder and milk-veins of the milker. It is possible to get heifers of this type. Then, if we use on these, pure-bred sires from families whose milking qualities have not been altogether neglected, we will obtain good results. In closing, I would like to urge on breeders of pure-bred cattle the desirability of supplying bulls of this class,

and upon farmers the necessity of knowing what to look for in their heifers in order to obtain good results in both beef and milk.

Q.—I would like to know what success the young man has had in turning these dual-purpose cattle into money?

A.—The dual purpose cows that I keep, are some of them pure-breds and some of them are grades, and at the milking pail the year before last they earned $48 on the average, and their calves at three years old will weigh 1,400 or 1,500 lbs., without any extra feeding, and that gives me a very fair profit; the calves will earn $20 to $25 a year, and the cows will earn $40 to $50 a year.

Q.—What characteristics do you look for in a dual-purpose sire?

A.—These are long questions to go into. I would look for a dual-purpose mother and dual-purpose grandmother.

Q.—Is it worth a man's while to go out and buy stockers?

A.—I have neighbors who say it is; because it saves them the bother of keeping cows. I have another neighbor who says he would rather keep a cow and raise a stocker to two years old. If I could raise all the calves I needed I would not buy, for two reasons. In the first place, competition is such that we have to pay too much, and in the second place I cannot get as well raised cattle as those I raise myself.

Q.—What would you do if you could sell your milk at 12cts. a gallon?

A.—I cannot answer that.

H. S. Arkell, Lecturer in Agriculture, O.A.C., Guelph: I feel rather at a loss as to how to commence. I do not quite agree with all that Mr. Drury says, but he is rather a heavyweight to combat as a speaker and practical man. There are some things, however, I should like to take exception to. Mr. Drury says he was much disappointed with the stockers produced from the use of Shorthorn sires. The point I wish you to consider with me is this, that at Chicago three breeds—the Angus, Hereford, and Galloway—have never been known as dual-purpose cattle, yet we find that the best animals are brought forward from them, and were sold in carload lots at the top of the market, and the men on the American farms find that they make money out of that kind of cattle. I do not know that all the Shorthorn breeders in this country have forgotten the milking strains in their cattle. One of the best known Shorthorn breeders in Scotland considers the milking qualities of his cattle, and we know for a fact that they have found a ready sale wherever Shorthorn cattle are known.

I should like to mention a breed not known in Canada—the Red Polls. I was much interested in the Red Poll cattle at Chicago. They seemed a little out of place there. Prof. Day told me when he was at the Royal Show in the old country he noted that the Red Polls were judged largely from the standpoint of beef production, but that the dual-purpose qualification did not receive much attention at the hands of the judges. At Chicago a judge there said, "I will not put a cow to the front unless she has a good udder." It would seem that it has scarcely ever been possible to find judges in agreement as to what should be considered the standard of merit in dual-purpose cattle. Further, steers from Red Polls did not bring the price other cattle brought. I would like to ask Mr. Drury if he would advocate that the farmers of Ontario should go to this limit in breeding dual-purpose cattle.

Mr. Drury: I am not familiar with the Red Poll cattle. I have seen very few specimens of them. I said in my address that there was no doubt a high quality of beef could be made from the special-purpose beef animal; whether it would pay is another question. We have to supply an ordinary export market, and we have to consider the question whether it would pay

us under the conditions as they exist in Ontario. On ranches they have another set of conditions, but I question whether we can afford to keep a breed where the calf on growing into beef would have to pay his mother's board as well as his own.

Mr. ARKELL: I was looking at these classes of export bullocks being judged this morning, and I thought we had not reached the standard of cattle that they have on the other side. I fully agree with Mr. Drury in what he says that the milking qualities of the beef breeds should be considered, particularly in the case of the beef breed that finds favor in Ontario, and, as a matter of fact, prominent breeders of Shorthorn cattle do keep these carefully in mind. A cow that will not nurse her calf will not make a successful breeder, but we can at the same time keep the beef question as the first consideration with the prospect of producing steers that will command the highest prices on the export market. I am fully prepared to admit that the second consideration should be, however, the milking qualifications of the breeding cows.

JUDGING BEEF CATTLE. (ILLUSTRATED.)

By JOHN GOSLING, KANSAS CITY, MO.

I enjoy an audience like this, and I enjoy the Canadian people, because there is an anxious look on your faces. I have been so thoroughly entertained that it gives me pleasure to try and entertain and instruct you for a short time. This steer (indicating) is one that was in the last ring of the show, and the competition was for the best export steer. Some of you heard me say this morning that twenty-five years ago the idea was that if they would send mountains of beef from America to England, they would accept it, and that the English people would eat more fat than the American people, and at the time they could not get steers too fat; they exported these mammoth steers from Chicago to London, England, weighing a ton. The price at that time was about 7 cts. a lb.; the weight of steers gradually came down from a ton to 1,900, 1,800, 1,700 and 1,600; now a 1,400 steer or heifer is fairly acceptable in the English market. If there is too much tallow there is too much waste. Suet used to sell in England at the same price as steak, and there was a great scarcity of it in the native beeves forty years ago, but since that time the great packers in the United States of America have been making butterine and oleomargerine, and there is a probable decrease in the price of suet, and when a person buys a roast or a steak in the United States he says, "Throw me in a piece of suet." If a man buys a steer that dresses 1,200 lbs., and he has to sell a lot of that meat at 2½ cts. a lb. he won't remain in the business very long. I asked the owner of this steer his weight, and he said about 1,350 lbs.; he will be two years old in March, and when you get them up to 1,350 at 20 or 21 months old you have been giving them something, and when they have responded like this steer has they are going to give you something in return. Breeders should never get away from straight lines in cattle. Have a straight top, straight bottom line, straight side line as near as possible. There is just a little downward tendency from this steer's hook bone back, but that is redeemed by the form of the hind quarter whenever hung up.

There is one thing that attracts your attention to this steer, and that is the richness of his coat; there is quality under all such coats of hair as

that; it never fails. If there was anything that marred the beauty of the Champion steer, it was a little tendency to coarse hair; his hair was rather long and coarse, compared with this one. What do you find on the Galloway? Long and coarse hair. What do you find on the Welsh runt. Long and coarse hair. If you have ever eaten an orange, you have found that some of them were dry, because the coarse meat of the orange will not hold the juice in it. This applies to coarse grained flesh. I know before this bullock is killed, that he will have fine, textured flesh; it will be fine in the grain, and undoubtedly, nicely marbled. I can tell that from handling and the pliability of the hide. If I run my finger up the hair of a steer, and it resents my fingers, and some of them are like slivers, I know that steer has coarse meat.

Just look at the head of this steer; there is nothing coarse about that head, he has an almost effeminate head, a bright eye, and is nervous and modest and backward, because he would not come in at the door. (Laughter.) He is not a forward, bold chap, not by any means, but he is forward at his feeding. Look at that face; physiognomy has a good deal to do with a steer. Look at the expanse between his eyes—his brain box; that tells you he is intelligent and has refinement. There is not too much length from the eye down to the nostril; he has a typical Shorthorn head. Judging this animal the first point to be looked at is his tongue root—the ball of fat—and whenever it is there, you can calculate the animal is ready to kill. You see how nicely his head is put on to his neck; he does not have a long neck like you find in the Jersey, or in the milking breeds; they are not built for anything but a milking machine.

Then you come to the collar, and here is another illustration of what I spoke to you about. With the steers in the Champion class, the collar, this little bulge on top of the neck, is known by butchers as the "rose of fat." There is about an inch and a half of fat there right on top, a fat vein on the neck; a boiling piece or the mince pie portion when used. The side is beautiful, as a whole, the shoulder-point does not protrude like some, so that you can almost hang a set of harness on, but it is neat and well covered.

Then you come to the shin bone or soup bone; flesh comes right down to his knee. In other words, he has plenty of muscle, and that signifies plenty of lean throughout the carcass. When you see the muscle big, you will know that the flesh will be big. Come along the vertebrae, and you will find that there is a covering of half an inch of beautiful white fat. I know it won't be yellow. Cattle that are cared for as this one has been, do not turn out yellow or high-colored fat. Whenever you see a piece of beef on the block that has nice white fat, you can count on it being young and tender.

Now look at the spring of his rib. It is beautiful. It is not flat-ribbed at all. There is a roll of fat about an inch and a half to two inches, and he is closely ribbed up. He is like a Percheron horse, ribbed up close indicating an easy keeper. We find plenty of depth of flank. I come on back here, and we find the distribution of the layer of fat from the bone of the hip to the end of the rump bone is splendid. It could not be better; and there you have got two inches of depth. The outside of the thigh is as it ought to be, not bulged out but straight down. The thigh beef or the round of beef sells for the same price in the country town, in our part of the world, as the loin does; but you go to the city butcher and he will say 10c. for round and 22½ for the loin.

What men should cater for, are such steers in build or form as the Champion steer, that you can turn up-side-down and have no more bulge than you have on top. That is the kind we are looking for: such that dress a big per cent. net to gross; but they are pretty hard to find. The deeper the body, the more coarse the beef, because you only go a certain distance with your rib of beef. We are governed more by percentages than ever and the test for results; *i.e.*, more weight in high priced parts the better. My experience as a breeder and butcher for thirty-five years taught me that.

There is another point we do not want to overlook, and that is the brisket. Old men that I have known for forty years will cling to a piece of brisket, but I have never found any comfort in eating it. We look at some steers to-day with a brisket as big as a fifty pound sack of flour. It caused comment between Mr. Gibson and myself, simply because a flabby profuse brisket is waste from a butcher's standpoint. A breeder's opinion is different, and to some extent the breeder has specific ground for admiring it. The black people in our part of the country, would be insulted if you sent them ten pounds of it, because their ambition is to eat chicken.

If you want your animals to win in the show ring in the younger classes give them milk and cream and butter and everything. Feed them well on the start, and as I told a man who spoke to me about it, if you do not want to give them milk, give him sugar. He said, "I am giving him black-strap now," and I said, "All right," I never had any only when my father gave it to me." (Laughter.)

Q.—What do you say as to his bone?

A.—The bone is just right, I would not want any lighter or any heavier.

Q.—What improvement would you put on him to make him an ideal steer?

A.—I would have him come out a little straighter from his hook bone back.

Q.—Could you not get them too square?

A.—Yes; you can get them too square. There is just a modest turn or droop of rump some would say low quarter that does away with that square hind quarter when slaughtered.

Q.—What about his shoulder, is that perfect—the top of the shoulder?

A.—Just as nice as it can be. Do not get the crop mixed with the chine. This steer is fat enough, and has a wonderful amount of flesh right in there. He has got as much lean in his rib as some of those heavier ones we admired to-day. I recall one steer that was killed at a Fat Stock Show, The Chicago International. He was a Hereford that reminded me of a Leicester sheep. You know the Leicester has not got much lean along the back or any other part of the body. (I do not think you have had very many improved Herefords in Canada. They had one very good bull at your College a year or two ago named "Spartacus.") Well this particular steer was fed by John Letham, a young man who studied at one of the colleges in Canada, and he said to me, "He has the best flesh I ever had." I said, "When he is killed you will run like a scared dog." And when he was killed there was not more lean in that rib of beef than what you could see between the space of my thumb and finger, and I could not get Mr. Letham to go and look at him. He said, "I have heard of it." It was really two-thirds fat and one-third lean.

Q.—I am afraid you are leaving the impression that it is just as well for an animal to be thick over the chine and crop?

A.—In proportion with the body throughout; isn't he as heavy right through here? And he has half an inch of spine fat covering throughout, enough to grade his carcass choice; half an inch is as much as you or I want.

SHEEP REARING.

A number of reasons most commonly advanced by farmers for not keeping sheep on their farms were discussed under the following headings:

(1) "That Sheep are not so Profitable as Other Classes of Live Stock."

(2) "That Sheep are Hard to Fence in."

(3) "That Sheep Crop Pastures too Closely and Foul it for Other Classes of Live Stock."

(1) THAT SHEEP ARE NOT SO PROFITABLE AS OTHER CLASSES OF LIVE STOCK.

By Robert Miller, Stouffville.

I am in a peculiar position this morning; because I am a witness for the defence, and it appears from the programme, that I should be on the other side, and appear as a witness for the prosecution. Before beginning with the real subject under discussion, I would like to offer my congratulations to the Agricultural College, on the great success they attained last week in the judging competition in Chicago. (Applause.) I would also like to congratulate the sheep breeders and the cattle men of Ontario, and particularly the horsemen of Ontario, on the great successes they won in open competition in the Chicago exhibition. I can assure you that it is a wonderful thing, that in two of the most important classes, Clydesdale, and Hackney breeds of horses, Ontario men alone sent representatives of their studs into the ring to show for the champion prizes.

I have been so busy, because sheep are so profitable in this country, that I have not been able to sit down and give this matter full attention. I believe there are not many reasons why sheep are not more generally kept by the farmers of this country, and why they are thought not to be so profitable as other breeds of stock. I believe the general reason is, that too many men think that sheep are too small a thing for them to waste their time upon. When times are good, farmers will buy horses in preference to almost anything else, and we have far more so-called breeds of horses than any of other class of live stock, but at the same time, there are very few genuine breeders of horses in the country. The moment times begin to get hard, and we begin to feel that financial pinch that comes to us in every cycle of years, then you see the farmers go back to the sheep. This is always the case, whenever cattle are high in price, sheep are sure to be low in price, and whenever cattle and horses get low in price, then sheep begin to be appreciated, and they become valuable. It is most difficult for me to give evidence as to why sheep are not profitable; because in the experience I have had, and the experience of the men I have known, we have been successful with sheep. It is over seventy years since my father founded the flock we have at home, and I have heard him say many times, that he never knew a year in his experience when his sheep did not pay him a profit. There has never been a year in all that time, that our sheep have not made

a return on the proper side of the bank account. There have been plenty of years when we could not make our cattle pay, and there have been far more years when we could not make our horses pay. There is nothing that will lose a man so much money in bad times, as high class horses. We can feed five sheep for the same price that it costs to feed one horse or a cow. If you will sit down and carefully figure it out, you will find that five good sheep will make more profit than the average cow that is kept on the farm, or the average horse, and one man can take care of 100 sheep much easier than he can of 20 cattle or horses.

Some people seem to think that if they spend any time attending to their own business, that time is lost. They seem to be always wanting to look after other people's business. I think it is a good plan to look after your own business, even if it is sheep you are looking after on your farm. Some people have the mistaken idea that sheep do not require attention; they will be better for a little kindly attention, even if they are out on pasture. They do not need as much as other stock, but they do need some attention, and they will repay you for what you give them.

With regard to the kind of sheep a man should keep, I do not believe there is very much difference. I have some radical notions of my own, and perhaps one of them is that I believe there is not much difference in the breeds of sheep, I believe the most important thing is to have good representatives of the breed, and then pay that attention to them that they require, in order to make them thrive well, and if we do that, there is no question that we will find plenty of customers amongst our neighbors from the other side of the line. The men in the United States that have money keep jumping from one class of stock to another, all the time. They have not got the stability that we in this country have. When cattle become dear, every man in the United States must have cattle the next day, or there is going to be trouble. When horses become high, every man is bound to have horses. When horses and cattle go down, and sheep are selling pretty well, then every man makes a desperate effort to get sheep. It has been so this year. Although horses have been selling for a big price, cattle have not been selling so well; but at the show, men were almost fighting to buy old ewes, in order to take them into their breeding pens to lay the foundation of a flock of sheep.

Sheep, like anything else, pay better when times are good, but they will make a profit even when times are bad. I might cite you a few cases to prove that sheep are a paying commodity. There are no men who have lived a more careless life in business, than the sheep men of Australia, and there is no class of men on the face of the earth, that have had more pay for the time they have spent in the business.

Great fortunes have been made there. They have had great droughts, but nearly all the sheep men in that country have laid up so much wealth from the breeding of sheep—and not very good sheep,— that nearly all of them have very large bank accounts, and they can stand the losses they have suffered in poor years. And it is the same with the sheep men of Africa. I know a man who makes sheep dip who got an order amounting to £70,000 or $350,000 worth. He got an order with that much money attached to it at one time, for sheep dip, to be sent to South Africa. Then look at England, and you will see sheep men living on land for which they are paying a high rent, and they are able to pay their rent and their taxes when other men were not able to pay the rent that the landlord exacted from them. The sheep breeders have always been prosperous and they are, per-

haps, the most prosperous body of farmers that are in existence in any place in the world.

There is no country in the world where they have more bleak land than in some parts of Scotland, but even on that poor land sheep breeders have become well off, and they make a splendid living under their hard circumstances. They have sheep adapted to their own particular style.

So far as this country is concerned, I do not think it is necessary to have any particular breed of sheep, but there are some districts where some of the heavier breeds will do better than others. I believe the proper thing is to have a few sheep on almost every farm, because they will find their own living and you will never miss what they eat. They will clean up weeds in the fence corners. I think it is of more importance that you be careful not to overstock your farm than it is that you keep any particular breed. I have never known a man who is a sheep farmer to fail in business. That is a pretty strong statement to make.

Q.—Have you had any trouble with maggot in the head?

A.—No; I believe the fly is becoming extinct in our district. I believe that draining the swamp land has caused the fly that lays the egg in the nostril of the sheep to become extinct. I have not seen a case of dizzy head in our district for over twenty-five years. We have stomach worms and lung worms. I believe sheep ought to be drenched with something twice a year to take these worms out of them.

Q.—What about tape-worm?

A.—We never have it in our district.

Q.—Did you ever have sheep with scab?

A.—Yes, I have had that; we are not supposed to keep them. I buy a great many sheep, and if they come from a district where there is likely to be scab, I quarantine them. I never had but one case, and we noticed it while it was in the quarantine.

Q.—Do you dip your lambs?

A.—Yes, we dip every sheep we have twice a year; we have an ordinary dipping vat, and everything goes through the vat.

Q.—What time of the year do you dip them?

A.—Just as soon as they go out in the spring, and before we put them into the pen in the fall.

Q.—Don't you think sheep running on the same pasture year after year has something to do with their health?

A.—Yes; if you keep sheep on the same pasture every year you should not keep very many, because they are bound to develop disease. If the sheep eats all the weed seeds on your farm, you can be sure they will not grow again, and while the sheep kill all your enemies, the weeds, they do not kill their own enemies. I plow all my land. I do not think any land should be kept in grass more than two years.

Q.—How many sheep can you keep on a 100 acre farm?

A.—That depends on the class of your land. I believe if you have a gravel sub-soil so that everything will drain through the ground, and there is no danger of water standing on the land, you can keep a lot of sheep on it, all the sheep that it will feed, and it will never become foul or poisoned. On the other hand, if you have a close soil that is difficult to drain, a heavy clay, then I think you ought to keep very few sheep. You should not keep more than 20 or 25 sheep on 100 acres of clay land, but if you have 100 acres well underdrained, then I think you can keep 100 sheep to good advantage.

Q.—What will keep dogs away?

A.—That is something that our Legislature ought to be bold enough and honest enough to deal with.

Q.—Suppose the ewe dies and leaves the lamb, what is the best way to give it to another mother?

A.—The best way is to make that sheep think it is her lamb. I remember one case where a very valuable ewe had two lambs, and she died. I went to a neighbor and paid a good price for a ewe, and I covered the lambs so that she could not smell whether they were her lambs or not, and she took to them kindly. That is a matter that needs care. If it is a strong lamb, it will soon look after itself.

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*(2) THAT SHEEP ARE HARD TO FENCE IN.

By Jno. Jackson, Abingdon.

It is hard to understand why it is that sheep are constantly on the decrease in the Province of Ontario. I read in the paper not long ago, that we had not as many sheep as cattle. The Government has been trying to pry into the matter and no good reason has been brought forward. But one reason give is, that they are hard to fence in. A good many years ago, before there was any effort made to improve the breeds, it was pretty hard to fence the sheep with the fences we had in those days. But to-day, there is no trouble, because we have good fences. There is a good deal in training them. If you keep them alongside a poor fence, or out in the road where the neighbors have poor fences, and keep them half starved, they are likely to go through the fence.

The Southdowns are considered to be the hardest sheep to fence. I have kept them for forty-five years, and I have never had a sheep inclined to be troublesome about the fences. There is a good deal in the kind of fences. The old rail fence may keep back horses and cattle, and not keep back sheep, and you can make a fence that will keep sheep very well, and still would not keep horses and cattle. Fence makers say a fence is horse high and bull strong, and hog proof, they never mention sheep. If it will keep, out the other stock, it will keep out sheep.

One year I had a field with a couple of acres of roots alongside of it, and it was not fenced off, and I happened to have some lumber lying around, and I drove stakes, and put one 10 inch board about 8 or 10 inches from the ground and not one sheep went over it. Another time, I wanted to make a fence and keep them from another field, and I took two six inch boards and tacked them on stakes in the same way. Of course the lambs were small. These were exceptional cases, and it would not keep them under all circumstances. As long as they have plenty of feed there is very little trouble.

The cost of keeping sheep is very little, and they do a lot of good on a farm, in eating up the weeds and waste grasses. I think the best fence to put up to-day is the wire fence for any kind of stock. I think it is very unwise to use a bad rail. If you have a rail that is likely to go down in ten years, it is best to throw it out. They are worth about the same for wood as they are in a fence. A poor rail in the Russell fence is a bad thing for

*See page 76.

a sheep. I can build wire fences for the sheep alone, at a cost of 20c. a rod, counting stakes and everything. I would not use posts, I would use a good strong stake.

We have a fence that cost us 55c. a rod, and it is good for anything. We have another 8-wire woven fence that cost 24c. a rod after the posts were set; this paid for the wire, one barb wire on top, 2 No. 9 and 5 No. 11, hard steel coiled wire, and the cost for man with machine putting it up, staples, &c., this is called the "London Fence." Of course it is only top and bottom wire that is No. 9 wire. All No. 9 would cost about 7 cents more.

In building wire fences, I never weave in the top wire; I prefer a barb wire for the top, because it keeps them from rubbing. If it is a smooth wire, and if it is woven in, they lean over the top of the fence, breaking down your stays. An 8-wire fence can be built for from 25 to 50c. a rod, that will keep out anything. For a sheep fence alone, I would not put more than four wires. They will not jump at a wire fence. You could build a fence for $1 a rod that will keep the sheep in and the dogs out. To do that, you should build it 11 or 12 wires high, and put brackets on the outside and use barb wire at the brackets.

Q.—At what distance do you put your posts apart for the high fence?

A.—Twenty-five or thirty feet. Our own are 24, I would put them 30

Q.—Why not put them 40 feet?

A.—You can make a right good fence 40 feet, and then stake in between each post, especially if you use heavy wire.

Q.—Is spring wire the best?

A.—Yes. If you take a straight wire and put it up tight, the frost will contract it, and when it comes to warm weather, it will all hang slack. We have a fence of this coiled wire, it is up seven years, and it is just as straight now as ever it was.

Q.—Did you ever try cement corner posts?

A.—No, but I believe it would be a good thing.

Q.—Is there any difficulty in putting a piece of plank on each side of the post?

A.—It takes us half a day to put down one of these posts. At the bottom, at the back side of your post, put a piece of plank 2½ feet long, and then near the top of the ground on the other side, put on another piece of plank and then pack it all in good.

Q.—That plank will rot in a very few years?

A.—Use a piece of good oak plank. Another way is to take an ordinary post, and then take a big stone, and dig a hole on the other side of your post from where your fence is going, and then take a good strong wire, and wire it around the stone, and around the top of your post.

*(3) THAT SHEEP CROP PASTURES TOO CLOSELY AND FOUL IT FOR OTHER STOCK.

By H. S. Arkell, O.A.C., Guelph.

The subject that is assigned me is a rather difficult one to deal with. It recalls the warfare which used to exist between the sheep herders and the cowboys of the western ranches. The cowboys were accustomed to accuse the sheep men of leading their flocks to the best pasture on the ranches, making it practically useless for the cattle that followed them, and we have read that the cowboys frequently rode their horses through the flocks of sheep, killing them right and left and sometimes also would drive whole flocks over the precipices.

Some time ago sheep were kept in large numbers in Eastern Ontario, but now they have given place to dairy cattle. Travelling through there but lately, I asked the farmers how it was that they had given up sheep raising, and they stated that they could not manage dairy cattle and sheep at the same time.

We may grant that there are cases where probably the sheep may be accused of cropping the pasture too closely, but I do not know that the sheep are any more to blame than other classes of stock. I think that the fault lies often with the farmer in turning out his animals too early in the spring before the pastures have a chance to get well started, and to get so firmly established that the animals do not injure them in tramping over them. If the animals were retained in the stable for a couple of weeks longer, we should have far less trouble. We aim to get the sheep out in the spring as early as possible, but we usually put them in some pasture where we do not mind that they injure the grass. It does them good to get a first taste of the fresh soil early in the spring, and by providing a little paddock for them somewhere near the barn, it is an easy matter to keep the flock contented and healthy until they may safely be turned out permanently into the pasture field.

Another case where the sheep will make use of the pasture at the expense of other animals is where the farm is over-stocked. One year on our own farm we were over-stocked with sheep in July and had to hunt around for a place to pasture our cattle. Where pasturage is scanty, sheep crop it a little closely and leave little for the other stock, and, therefore, I think we should aim to estimate the number of animals that the farm will maintain throughout the year and guide ourselves accordingly. During June we find little trouble, because then pastures are most luxuriant, but towards the latter part of July we find that the pastures have failed a little, and then we must look around for something to supplement what we have already provided. It seems desirable to keep sheep moving from one pasture to another, and as the ordinary pastures begin to fail about the time that the lambs may be weaned, it is our practice then to turn the lambs on the second growth of clover which is usually ready about that time. We do not let them run over the whole field. We run a line of hurdles across the field and divide it in that way, and on half of the ten acre field we can run a goodly number of lambs.

The ewes after the lambs have been weaned will do best on dry pasture. We like to check their milk flow as soon as possible. Ewes do not

*See page 76.

need a great deal of feed for a month or two after the lambs have been weaned, and we allow them to run in the stubble or any place where they can pick up weeds, and that is the time when the ewes on the farm do most for the farmer by eating down the weeds. We plant a field of rape about the middle of June so as to have the rape for fall pasture for the lambs. That will keep them in good health and there will be less danger from disease. We plant the rape in drills and about at the rate of a pound to the acre.

There are two or three things which a farmer might keep in mind in sheep management. First of all, sheep assist the farmer in clearing his ground of weeds, and therefore a few sheep may profitably be kept on every farm. Another point to be noticed is that it is an unwise policy to overstock the farm with any one class of animals, and we must, if possible, keep the number of sheep on the farm relative to the amount of land we have. Finally, we must not keep sheep on the same pasture year after year, because if they are so kept they quickly develop disease. It is wise to have them on cultivated land as much as possible, and at least every two or three years they should be changed to a different part of the farm.

Q.—Did you ever try sowing rape with the spring grain?

A.—Yes, we have done that, but we discarded the practice because, as the shoots of the rape appeared in the sheaves, it was more difficult to cure the grain and we found that the growth of rape did not pay for the trouble that was taken in sowing. The lambs also rubbed the wool off their necks badly in the stubble and that spoiled the appearance of the flock.

Q.—What would be a good live profit on 14 or 15 sheep?

A.—A good average is 6 or 7 pounds of unwashed wool. You will get from 16 to 18 cents a pound for the wool, which will bring, approximately, $1.50. Averaging a lamb and a half per ewe, and at $5 each for the lambs, you will receive per ewe, $7.50. Adding $1.50 for the wool, making in all $9, and you should get fairly within that figure every year.

Q.—When you sell your lambs for the Easter trade have you any trouble with the ewes getting too fat and not breeding the next year?

A.—Sometimes they become over fat and do not breed. Ewes forward in condition we breed earlier.

Q.—Do you not think it is better to breed with an aged male?

A.—Certainly, if you can pay the price for the aged male, but I think with a small flock of ewes you will get very good results from a lamb.

Q.—Your lambs will not be so strong as from a four year old?

A.—The question is may it not be just as profitable when you have a small flock to use a lamb?

Q.—How far apart do you have the drills in sowing rape?

A.—About 28 inches.

Q.—What time do you sow the rape?

A.—About the middle of June.

Q.—Do you sow rape at the same time as corn?

A.—Yes.

Q.—Would it not be better to hold it back ten days or two weeks?

A.—Sometimes we have done that.

Mr. CAMPBELL: I have given up sowing rape with the grain for the same reason that Mr. Arkell gives. I think it is a good practice to sow the rape eight or ten days later, and just roll it in.

Q.—Do you milk your ewes after weaning the lambs?

A.—Very seldom. We put them into a pen after weaning and keep

them there 24 hours with no feed except a bit of dry hay. We watch the ewes to see if there is any inflammation in the udders and if there is we draw a little milk from them.

Q.—What is the best season of the year to have lambs come for the general farmer?

A.—Towards the end of March or the middle of April.

Q.—When do you market?

A.—We have been dealing largely with pure-bred stock. I think the most successful practice is to sell them in the fall. We have them weigh 100 or 120 pounds in October.

A DISCUSSION OF THE ACT FOR THE PROTECTION OF SHEEP, AND TO IMPOSE A TAX ON DOGS.

John Campbell, Woodville: The three speakers who have preceded me were all given subjects on the practical side of the sheep business. There are comparatively few who see any practical side to the sheep industry in Ontario, at present, or have seen during the by-gone five years. Indications of a great change are looming up on every hand, all pointing to sheep breeding getting its proper place in Ontario ere long.

There are two classes of animals in the Province of Ontario that do not work well together, they are sheep and dogs. The sheep is the animal that is making a good lot of money for the Province. Dogs, on the other hand, are useful to a certain extent, but I will say that where you will find hundreds in dogs, you will find millions in sheep, and I would like to ask whether the people in the Province of Ontario are protecting the sheep against the dogs in the way that they should. I think there is a great deal of sentiment in it, and the people are not making use of their intelligence and business capacity in this matter that they are doing in their other lines of business.

The mongrel-bred dog, or mongrels of any other class of farm animal, never gives any profit, but always annoyance and loss.

Second-class may be of some use, but it is the first-class animals that pay best, and the third-class are no good, and we should try and get the Legislature to help us get rid of the plague of mongrel dogs that are such a hindrance to the best paying industry that we have in the Province of Ontario. Some will say, "We have legislation," and so we have. In our municipality a number of years ago the assessor went around and taxed dogs $1 each and females $2, but the next year a petition was gotten up by 25 ratepayers which was placed before the Council, and they passed a by-law so that the Act would not be put in operation the next year, nor any year after. There are so many loop-holes in it, that when we take up the newspaper and read of decisions given by judges it seems we have very little indeed. I am going to give you the opinion of men from all over this Province as to what they state on this question of dog tax.

1. That it should be compulsory upon every municipality to impose an annual tax on dogs.

2. That the tax upon one male dog of a household, should be moderate, say, one dollar, and that the tax for a second male dog and for a bitch should be heavy, some putting the tax up to $5 and even $10.

3. That the money collected in taxes on dogs should always be available to pay for injuries done to sheep by dogs.

4. That the Council of each municipality should appoint one or more competent persons whose duty it should be to adjust the amount of compensation.

5. That the taxes collected by each municipality shall constitute a general fund for the county (or Province) out of which to pay for injury done to sheep by dogs.

Lieut.-Col. Robt. McEwen: I quite agree with Mr. Campbell that the second section of the Act should be struck out entirely. I do not think it should be the privilege of 25 ratepayers of the township to get by-law passed. If the dogs can be kept in the township without being taxed I think it should be compulsory that every township should pass a by-law to collect all taxes on dogs.

Every man that keeps a dog that is not worth paying $1 tax on, I think it would be better if the dog was out of the country.

There is one other section of this Act that I would like to see altered, and that is section 18. I consider the taxes are collected for the purpose of paying for any sheep that are destroyed; it is not collected for any other purpose in the township, and if a man has lost his sheep, why should they only pay him two-thirds of the value?

Mr. Miller: If they find the owner of the dog, he is supposed to pay the full value, and that would cause any man to try and find the owner of the dog.

Col. McEwen. I do not see why full value should not be paid for the sheep. I think that he should receive the actual value of the sheep. There are plenty of people not far from towns who own dogs, and who stroll out in the country and take dogs with them, and very often they go home without their dogs, and the dogs create a great of trouble in the night. Some people won't keep sheep for the simple reason that they are afraid of dogs worrying them, and if these people knew that the loss caused by dogs would be paid in full, a great many more people would go into sheep.

Q.—From what standpoint would you fix the value?

A.—Their breed value. Any man can collect two-thirds the value of a pure breed sheep.

Q.—The majority of the townships have a certain set price of $9?

A.—I do not think it is possible for them to say what the value is.

Q.—I had two sheep killed last year, and I had refused $18 apiece for them, and I got $6 apiece.

Col. McEwen: A dog is an animal that I consider has a place on the farm as well as a sheep; any person who has a good working dog, knows his value. The small boy is not always on hand, but the dog will always be there. The dog usually gets more kicks than favors, and the dog will resent it, but if you treat him kindly he will repay you for all the kindness you will bestow upon him. I think it is a good thing to get your sheep used to the appearance of a dog. Take your dog with you when you go among

your sheep and get them used to the sight of a dog, and then they will not be so apt to run when strange dogs come into the field. I have no apology to offer for a dog that will kill sheep.

Mr. JACKSON: I have had some experience with regard to this two-third valuation, and I believe in nine cases out of ten, in our township where sheep have been destroyed, they have got their actual value. They put the value up pretty high, so that two-thirds makes it about right. You might just as well insure a man for the full value of his house as to give him full value for his sheep.

Mr. GARDHOUSE: That matter came up in the County Council of the County of York and was fully discussed, and they seemed to think that if a man got full value he would not try to find the owner of the dog.

Col. MCEWEN: The farmer may be required to make an oath that he did endeavor to find the owner of the dog. If you have an Act, I believe in living up to it, and if a man makes a declaration that he has made a search to find that dog, I think he should be paid in full.

Q.—Why should the owner of the sheep have to be a detective to find out the owner of the dog? Last year in West Nissouri, we collected $328 for dog tax, and paid out $28 for sheep killed by dogs, and I claim the sheep men are not getting a fair deal.

Mr. SMITH: If the County Council do not pay two-thirds of the full value, you have your action at law. The Act is all right in that respect.

Mr. EVERETT: I have a resolution that has been put into my hands. "In the opinion of this meeting, the Statutes of Ontario should be so amended as to legalize the killing of any dog found at large at any time unattended, and that a copy of this resolution be sent to the Hon. Nelson Monteith, and to the members for action at the forthcoming session of the Legislature." (Cries of "No, no," and "Kill every one of them.")

Mr. MILLER: I contend there is only one side in that motion. I have two farms where I keep sheep; I go to one farm and I take my dog with me. I would not take $200 for this dog; I paid a big sum for her. She does everything I ask her to do on the farm. I take her to the next farm, and when I get through work on that farm I tell her to go home, and she goes home. Would not it be working a hardship on me if that dog was killed on the way home? Let us be sensible in these things. Let us work for fair things, and when we give that petition to the Legislature let us ask for what is right, and we will get what we ask. We claim that the sheep in this country should have more protection than the dog should have; but you will find that a man will fight for his dog quicker than he will for his sheep. There is no better friend of man than a dog, and sheep are just as true, but they are no truer. I think we should not ask for unreasonable things.

Mr. HANMER: I look upon this tax as a sort of an insurance. The Council of the township of Brantford passed a law that they would not pay to the excess of $8, and where damage is done they will not pay anything unless the sheep is killed. I do not think that is right.

MUTUAL INTERESTS OF THE HOG PRODUCERS AND PORK PACKERS.

By J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa.

It is almost impossible to say anything more on this well threshed out subject, but supposing the interests of the country to lie to a great extent along the development of the bacon producing industry, then I think it advisable to consider some of the general points which enter into this industry. The interests of the packer and producer should really be identical. I believe they are identical. The trouble is that we have been watching to see if we can detect the little points where the packer is getting the better of us, and if we cannot find some way in which we can do him, instead of his doing us.

Now, I do not believe he is eternally getting the better of us; possibly sometimes he does us, and possibly sometimes, we do him.

The first point of importance in this subject is that we should produce bacon as cheaply as possible. It would no doubt be to the interest of both parties to develop this industry in such a way as to enable farmers to produce at a very low cost.

The farmers in this country, and the experimental institutions, have for years been doing all they could to help in determining the best methods of feeding, and to find the value of different feeds, to find out which are the most suitable feeds, and the best way to feed them. I believe the packers are just as anxious as we are in these matters, and have done something to reduce the cost of producing a pig ready for the market.

The next consideration is that pigs should be of uniformly good type. I think you will admit that, from the packer's side, it is to his interest that every pig should be of the type suitable for bacon, as he wants to get an article, which, when it reaches the foreign market, shall be always of the same size and shape. The retailer does not want a box of sides weighing 50 lbs. to-day, and another box to-morrow weighing 60 or 65 lbs., and the next day to get a box weighing 35 or 40 lbs. He wants them all to be nearly of the same size. It goes without saying that it is to the interest of the packers that every pig produced should be of a certain size and thickness. Is it also to the interest of the producer, that pigs be of this character? I think it is. If the packer can command a better price for the uniform article he will be able to pay a higher price to the producer. Therefore, granted that animals, whether of good type or bad type, could be produced at the same cost, I think it is undoubtedly to the material advantage of the producer and packer that every pig produced in Canada should be of a uniform type.

Another question is uniformity of quality. By quality I mean firmness, and thickness, rather than thinness. The producer controls to a certain extent the quality of the bacon he is producing. That has been proven over and over again. That he has absolute control is not so certain, and I think it is undoubtedly to the interests of both producer and packer that every effort should be made to determine what influences affect the quality. At Ottawa we have carried on experiments to determine what things affect the quality. It was for a time supposed that climatic changes had some effect. That idea has been abandoned, and we are almost of the opinion that illy fed swine are the ones that produce soft pork. In my

experience poor feeding is the most frequent cause of poor quality of bacon. It is to the interest of every producer to determine the cause, and, if possible, eliminate the conditions or influences effecting differences in quality. We must have pork of uniform quality if we are to command higher prices in the Old Country.

I must say that I think packers do their best to send a good article to the Old Country, if we judge by the bacon they give us to consume here. I find the greatest trouble in securing a prime article of bacon on the Ottawa market, and I concluded from that the packers are doing the best they can to send good bacon, because we do not see any of it at home. We want a uniformly good article for ourselves as well as for the foreign consumers.

We cannot make every pig of uniformly good type, but the producer ca- improve things very materially.

Another vexed question is the production of bacon pigs in fairly uniform quantities the year round. The trouble in this part of the country is that the average farmers have all the litters come in the spring, and feed them through the summer and have them ready for the block in November, December, and January. If we are going to have a uniformly plentiful supply for the foreign market, according to demand, we must remember that the consumer in the foreign market is going to eat bacon just as readily in July, March or September, as he does in the winter, and we must contrive in some way to get a uniform supply.

Q.—You say you cannot produce pigs as cheaply in winter as in summer?

A.—The packers are willing to pay a considerably higher price in the spring than they are in the fall, not only on account of the law of supply and demand, but because it is to our interest to supply pigs the year round. If the packer is going to hold his best markets, he must be able to supply his best customers with a good article the year round. If we do not feed swine in winter we will suffer for it by getting lower prices for our swine. Farmers are apt to think it is to the interest of the packer only, that he should have a supply of pigs the year round, but I contend it is to our interest that we furnish them with a supply the year round; and if we take prices as they have ruled for a number of years, we will find that the prices in the spring rule, usually, from ½ to 1c. a pound higher than they do in the fall. By furnishing a regular supply we retain our best customers. I maintain it is to the interest of the packer to pay the highest price possible. Of course, the packer is apt to be short-sighted, and squeeze the innocent farmer every chance he gets, but I think by doing so he is making a great mistake, because each time he gives a squeeze, there is a squeal, pork production is diminished, and our market suffers. We cannot by law compel packers to give us any higher prices than they will; that is a problem that may not be settled by discussion.

The most vexed question of the whole thing is that packers pay the same price for the thick fat pork or the thin unfinished pig as they do for the No. 1 selected. It is undoubtedly to our interest that they should not, because, I think we all agree that it is somewhat more difficult to always produce the uniformly good bacon pig.

You cannot get a litter in which there will not be some individuals more easily fed than others, and where you have one-half a dozen litters altogether, there is bound to be a quite considerable percentage ready for the block before the rest.

Now, the average farmer does not want to be bothered making two

trips to the market, and he takes them all along, and says he will make that fellow give him the top price for the bunch, and the consequence is that your neighbor who has been most careful, taking only prime pigs, does not get a cent more a pound than did you who took all sorts.

I think it is to our interest as farmers to quit that. I am confident it is also to the interest of the packer to pay according to type and quality. He is always ready with some plausible excuse about that wicked buyer in the country, he is always willing to say he buys according to quality, and pays according to quality, when they reach the packing house, but well we know he does not do so. I think we ought to find some way in which we could compel him to pay according to quality.

At certain points in Canada, there are referees, who have to pass on any dispute that may arise as to the grading of cheese, and I see no reason why it should not be possible to have some men at different points, to classify pigs, and say, "These pigs are No. 1 or No. 2, and must be paid for as such, the price to be fixed by the packer accordingly.

I would like to hear this matter discussed, because I think some solution of this problem absolutely necessary if the producer is to be satisfied, and if the industry is going to progress the way it should in the near future.

There is only one other point. Our bacon has advanced in quality and favor in the foreign market. In reading the paper the other day, I saw where English Wiltshire sides had been compelled to take second place to Canadian bacon. It sold for 74s., and the English Wiltshire at pretty nearly 72s.

I believe we have in this country ideal conditions for the production of bacon. Our packers and our farmers are learning how to produce bacon of superior quality, and the day is not far distant when our bacon will stand at the top. To-day large quantities of our bacon sells on the British market as Danish bacon, and commands the same price; but just as soon as we can get above a certain price, then they call it Danish bacon and not Canadian. We want to find some way to compel merchants to sell our goods according to name and not try to give another country the credit.

It is not for the sake of the other country that they do it, it is merely a commercial swindle, and we want to get over it in some way if possible. It is a practice which is doing no small amount of damage to us. We are coming nearer and nearer the top notch as producers.

From observation and from some little experiments I am of the opinion that, generally speaking, the packer is very anxious for a wide margin, and I am of the opinion that, generally speaking, he gets a wider margin than is quite necessary. I think the packer is making a mistake when he tries to get too wide a margin. He says "I must have insurance; there comes a time when I sell at a loss." I have long been in correspondence with and known packers, and I never remember hearing of their making money. I do not believe, therefore, that they were always telling the truth when they said they were losing, and I have good grounds for the belief that they are making too wide a margin in many cases, and I am confident it is to their interest to not mention the margin although they try to appear open and above board.

Bacon production is almost at a standstill in Canada, and we are not increasing the way we should. Why is this? I think the narrowing of the margin would help to increase the product considerably. If we could get the packer to believe that, I think there would be one part of the solution right to hand.

Q.—Would state owned and controlled packing houses be of advantage to the farmer in securing for him a better price, and also putting a more uniform article on the market?

A.—That is a very vexed question, and one that leaves a great deal of room for discussion.

Q.—I will cut off the last part. Would state owned and controlled packing houses be a benefit to the farmer?

A.—We could hope to get nearer the actual worth of the product, but it would be a certain disadvantage, because it would compel the state to pay a higher price, and you might have to make up the difference by taxation.

Q.—The man who would venture to answer that question would be a pretty bold man. If you are going to establish aid, and state control for the bacon business where would you stop?

A.—I do not say state aid.

A.—When you control, you practically aid.

Q.—Are matters any better to-day than they were before we had discussions on this subject last year? Are we any better off than we were before?

A.—I do not think there was ever any year in the memory of any of the men here that the price of pork has been higher than it has been for the past year, and I think these developments and the increased price is partially due to the discussions and investigations that have been carried on at this Fat Stock Show. During the past summer the price ran up as high as 8 cents per pound, and over that at one time, and during the fall it has never been below 5½ cents. At present it is 6 cents a pound.

RESULTS OF PRACTICAL FEED TESTS RELATIVE TO THE COST OF PRODUCING BACON HOGS.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

This work supplements our own investigations in connection with the cost of raising hogs for market. The work was made possible by the Wm. Davies Co., Limited, of Toronto, who generously offered to pay for finished hogs 50 cents per cwt. above the market price prevailing at the time they were marketed, to farmers who would render a full report upon the food consumed by the hogs from weaning until marketed, and upon certain other points necessary to an intelligent study of the question. The details of the work were entrusted to our department, and, up to the time of writing, ten reports have been received from farmers who conducted experiments according to directions. The work, so far as we know, is unique, and the results should be of interest and value to those interested in this important industry. It should, perhaps, be explained that the farmers were allowed to feed the pigs in their own way, and the only rules prescribed were those pertaining to the nature of the facts to be reported. Each report bears a declaration, signed by the experimenter, that it is correct.

Cost of Young Pigs: In our own experiments with 12 litters, the average cost per pig, counting everything (except risk) which we thought could be fairly charged against each litter, was $1.27 at weaning time. To be on the safe side, however, we have charged the pigs used in these experiments at $1.50 each, at weaning time. It must be remembered that the prime object of all this work is to increase our knowledge of what it *costs*

the farmer to *raise* pigs and finish them for market. In our general average, however, we have also worked out the cost of these hogs on the basis of $2.50 each for pigs at weaning time, for the satisfaction of those who *buy* young pigs for feeding.

Valuation of Foods: For what may be called supplemental foods, we have used the following values: Skim milk and buttermilk, 15c. per cwt. Roots, $2.00 per ton. Green foods, $2.00 per ton. Whey, 4c. per cwt. These values may be open to question, but it is the meal ration which has the greatest influence upon the cost of feeding, and it will be noticed in the table that we have worked out the cost per pound on the basis of four different values for meal, viz., $20.00, $21.00, $22.00 and $23.00 per ton; our desire being to show what might be regarded as the extreme limit of cost. The term meal includes bran, shorts, etc., as well as ground grain. We could not use the values furnished by our experimenters, because it was necessary to have uniformity of values for purposes of comparison. The exception to this rule will be found in the column under the heading "food consumed." Where values for pasture and miscellaneous foods appear in this column, they represent the values attached to these foods by the experimenters, with the exception of lot 8, where we added what we thought a rather excessive charge for pasture, judging by the statement of what the pigs received.

The table which follows looks somewhat formidable, but it is a table of such exceptional interest that we cannot see any way of curtailing it without detracting from its value. Every lot is worthy of study, and a more intelligent understanding of the general averages will be obtained by studying the figures from which they were computed.

Table I.—Details of Co-operative Experiment.

Lot.	No. of Pigs.	How bred.	Cost at weaning time.	Age when sold	Weight when sold.	Food Consumed.	Cost per lb. when Meal is worth per ton—			
							$ 20.00	$ 21.00	$ 22.00	$ 23.00
			$	Days.	lbs.		c.	c.	c.	c.
No. 1...	9	York. boar, Grade Tam and Chester White sow.....	13.50	217	1,800	Barley, 3,552 lbs.: shorts, 905 lbs.; mangels, 740 lbs.: green clover, 2,850 lbs.; milk, 1,620 lbs.....	3.56	3.68	3.80	3.93
No. 2...	12	Yorkshire	18.00	224	2,425	Barley, 5,374 lbs.; shorts, 1,169 lbs; mangels, $15 lbs: green clover, 3,900 lbs.; milk, 2,160 lbs.....	2.77	3.90	4.04	4.17
No. 3...	12	Yorkshire	18.00	247	2,360	Meal (barley, shorts, peas, oats), 7,333 lbs.; mangels, 545 lbs.; milk, 2,520 lbs.....	4.05	4.21	4.36	4.52
No. 4...	10	Yorkshire	15.00	238	2,050	Meal (barley, peas, oats), 5,171 lbs.; shorts, 1,038 lbs; mangels, 3,200 lbs.; milk 2,050 lbs.	4.05	4.21	4.36	4.52
No. 5...	7	Berk. boar, York. sow.....	10 50	233	1,535	Barley, 1,950 lbs.; wheat, 1,300 lbs.; oats, 800 lbs.; mangels, 6,000 lbs.; milk, 8,800 lbs.....	4.58	4.71	4.84	4.97
No. 6...	10	York. boar, Tam. sow.....	15.00	177	2,060	Meal (barley, oats, wheat, peas), 4,215 lbs.; shorts, 816 lbs.; whey, 15,000 lbs.; miscellaneous foods valued at $5.00	3.70	3.82	3.94	4.07
No. 7...	14	Yorkshire	21.00	213	2,740	Barley, 1,243 lbs.; shorts, 4,600 lbs.; corn, 1,585 lbs.; milk, 9,330 lbs.; small potatoes (3 bags) and pasture, valued at $5.90.....	4.20	4.33	4.47	4.61
No. 8...	7	Yorkshire grade...	10.50	194	1,300	Meal (barley and oats) 2,230 lbs.; shorts, 274 lbs ; milk, 3,960 lbs ; pasture and green feed valued at $5.00	3.57	3.67	3.79	3.86
No. 9...	14	Berk. boar, grade York. sow	21.00	179	2,740	Meal (barley and peas) 10,016 lbs.; mangels, 3,300 lbs.; milk, 4,020 lbs.....	4.76	4.94	5.12	5.31
No. 10..	8	Tam boar, grade York.& Tam. sow	12.00	200	1,740	Barley, 3,115 lbs.: shorts, 390 lbs.; mangels, 600 lbs.; milk, 1,200 lbs : 51 days on stubble, without other food.....	2.84	2.94	3.04	3.14

Comments.

1. A peculiar feature of the experiment is the predominance of Yorkshire blood in the pigs used. This probably has no significance, but it may call for the explanation that no stipulation was made in the conditions of the experiment, regarding the breeds to be used. Any breed, grade, or cross was eligible.

2. There is a remarkable coincidence in lots 3 and 4. The cost per pound of these two lots is practically the same, yet one lot was fed in Ontario county, and the other in Bruce.

3. Another coincidence occurs in lots 7 and 9, both as regards number of pigs and market weight, yet one of these lots came from Ontario county, and the other from Waterloo, points widely distant.

4. As previously explained, the pigs are valued at $1.50 each at weaning time, which is considerably above the actual cost shown by our experiments.

5. Lot 7 was made up of two litters, born the same day, but marketed about a month apart. The 213 days represent the average age of these pigs when marketed.

6. It will be noted that each lot was well up to, and that some of them were above market requirements as to weight. The weights were taken from duplicate weigh tickets, issued by the weighmaster where the pigs were marketed.

7. The cost of gain is more uniform than one might expect from hogs fed under such widely different conditions. Lots 9 and 10 are the two extremes, and call for special notice.

8. It is hard to understand the high cost per pound in the case of lot 9. Looking at the ration which was used, we must say that barley and peas do not look like a good meal ration for very young pigs. On the other hand, it must be admitted that the pigs made remarkably good gains, as they were scarcely 6 months old when marketed, and averaged 195 pounds. It is possible, however, that, though the pigs were not injured, they did not make the best use of the meal, and that there was waste from this cause. If it does nothing else, this group illustrates the point that rapid gains are not necessarily cheap gains.

9. In the case of lot 10, the owner had a field of mixed oats and barley which was very badly lodged. Consequently, there was a great deal of grain left on the ground after harvest. The pigs were turned on the stubble August 1st, and stayed there until September 20th, receiving no food but what they gathered for themselves during that time. As it is manifestly impossible to place a value up on such food, this group is not included in the general average, but it is inserted in the table as an example of how farm animals can frequently make profitable use of what would otherwise be wasted.

Table II., which follows, shows some general averages.

Table II.—Averages.

	When meal is worth per ton :—			
	$20.00	$21.00	$22.00	$23.00
Average cost per pound of 95 pigs omitting lot 10, when pigs cost $1.50 each at weaning time	4.07c.	4.21c.	4.35c.	4.49c.
Average cost per pound of 95 pigs, omitting lot 10, when pigs cost $2.50 each at weaning time	4.57c.	4.71c.	4.85c.	4.99c.

Average age at which pigs were weaned, 52 days.
Average age at which pigs were marketed, 214 days.
Average live weight of pigs when marketed, 200 lbs.

COMMENTS.

1. In both tables there is much of encouragement to swine breeders and feeders. The general average shows results from 95 hogs fed upon eight different farms, and reflects great credit upon the skill of the feeders.

2. That the average cost per pound should be within 5c: when meal is valued at $23.00 per ton, and the pigs at $2.50 each when weaned, is much beyond our expectations.

3. We regard $20.00 per ton a fair valuation of meal when the grain is home grown, as it includes much that is not marketable. Even when much of the feed has to be bought, we believe that, with a little foresight, the meal bill can be kept well under $22.00 per ton. If the farmer buys injudiciously, or uses unnecessarily high-priced foods, he should not blame the pigs.

4. These experiments show cheaper average gains than were obtained in our own work, but most of these experiments represent summer feeding, whereas, most of our feeding was done during the winter.

5. The experimenters who conducted this work, are Messrs. W. J. Cunningham, Nicolston; J. A. McKenzie, Columbus; Robt. Bray, Walkerton; James Scott, Galt; I. T. Gleason, Lakeside; W. G. Smale, Woodville; W. A. Rowand, Walkerton; Geo. Johnson, Cannington.

Q.—Do you know the price received for any of these lots of hogs?

A.—The price varied, more or less, as they were sold at different times during the summer and as late as November. The price would range from 6 to 7 cents per pound.

Q.—Have you figures showing the net profit on each hog?

A.—No, because these hogs were sold at different prices. The main object of this work was to gain information regarding the cost of production.

Q.—Was any allowance made for labor?

A.—As previously stated, no allowance was made for labor and no credit was given for manure.

Q.—What do you consider the best grain food for young pigs after weaning them?

A.—You will notice from the chart that a great variety of foods has been used in these experiments. Personally, I prefer to use wheat middlings for young pigs at this time. A few finely ground oats mixed with the middlings will sometimes make an improvement. After the pigs are between three and four months old, a little barley may be introduced and gradually increased as the pigs become accustomed to it. At this time, also, other grains may be added to the mixture. In fact, the greater the mixture of grains, as a rule, the better.

Q.—Is not milk worth more than 15 cents per hundred?

A.—Sometimes it may be worth a great deal more, especially when used in limited quantities for giving young pigs a start. Where it is used in large quantities, however, and especially where it has to be drawn every day from a creamery, I think that 15 cents per hundred is a very fair valuation.

Q.—Do you think hogs can be grown properly without milk or whey?

A.—It is certainly more difficult to raise pigs without either of these dairy by-products. The only substance that we have used that appeared to give very good satisfaction as a substitute for skim-milk is a product called tankage. Unfortunately, however, this product is scarcely available to the Canadian farmer, as it is manufactured in the United States. Pigs can be raised, however, without skim-milk or whey, but the farmer who has neither will always be handicapped.

Q.—Was there any difference in the quality of the different lots of hogs when marketed?

A.—They all turned out firm, practically no soft sides.

Q.—Would it not be a more intelligent chart if the pigs were fed altogether on bought food?

A.—The man who has to buy all his feed is not in a position to feed animals of any kind to advantage when competing with the farmer who raises his own feed. He can raise it on his own farm a great deal more cheaply than he can buy it, and if he had to buy he would be in about the same position as a manufacturer who had to pay the highest retail price for all the products he used. Such a manufacturer could not hope to compete with one who obtained a liberal discount on his raw material through purchasing it in larger quantities, or through having control of natural resources which allowed him to obtain his raw material at low cost.

Mr. Hutton: I think the meeting owes a great deal to Prof. Day for presenting this chart. All of us who have been feeding pigs know that we cannot get the same results from different lots. Individuality has to be taken into consideration, and this chart shows to us what variations we may expect from different litters of pigs. From my own experience, I know that pigs can be fed at a cost of about 4 cents per pound, and if we can produce them at 4 cents and sell at 7 cents, we need not bother about how rich the packers are getting. We are going to be able to pay off our mortgages and put money in the bank.

A Member: Some persons here have stated that milk is worth 30 cents per hundred. This may be true for certain conditions, but there are many farmers who live a long distance from the town and cannot sell their skim-milk, and if they cannot sell it, what better use can they make of it than employ it for feeding pigs. It is a splendid food for young pigs, and that is the best use to make of it.

A Member: I think a man realizes 40 cents a hundred when he feeds it to pigs.

Mr. GRISDALE: We carried on a number of experiments at Ottawa to determine the value of skim-milk for feeding swine. We fed it in large and small quantities with different kinds of meal to swine of different ages. When we fed from 6 to 10 pounds a day per pig, we found that the skim-milk was worth on an average about 15 cents a hundred. We got as high as 42½ cents per hundred where it was fed under exceptionally favorable conditions, that is, where it was fed to young pigs in small quantities and at the right time.

The CHAIRMAN: As I understand the discussion here, it has been asked, what does it cost per pound to produce pork? Last year Prof. Day gave us some figures of his own, and now he furnishes figures from ten or twelve farmers, and some of you are not yet satisfied. I suppose one might have a hundred other farmers repeat this experiment and they would get figures slightly varying from the ones we now have. If you are not willing to accept these figures, I would urge you to keep track of your own feeding operations and bring the results with you next year, as the more information we can obtain on this point, the better.

FARM LABOR PROBLEM.

By J. M. McGILLIVRAY, Staff Captain, Salvation Army, London.

We are continually confronted with the difficulties that present themselves in this matter of farm labor. I should like to speak of two or three of these difficulties. One of the greatest is to educate the farmers to the absolute necessity of making arrangements, not only to secure help, but to keep them the year round. To quote an instance. I went to a place called Watford, in the county of Lambton. A farmer had one of our young men. I enquired as to how he liked him and how he was getting along with his work, and received the reply that he did not know anything when he came to him, but was learning and giving satisfaction. I then asked him how long he would keep him, and received the reply, "Not more than seven months in the year." I remarked to him that he had a very nice farm. He told me that for the want of help he had to go out of raising much of a crop, and was just putting in a few fields of oats. His farm was worth $6,000, Now, you can draw your own conclusions from this, and plainly see the wisdom of keeping help when once procured.

We find the man who makes the greatest success of his farm is the man who employs his labor all the year round. Where the farmer employs a married man and gives him a house on the farm, we find in almost all cases this kind of help gives excellent satisfaction.

In the fruit-growing districts the people show they are able to do something and are putting up temporary houses where they will be able to take in families, and their children who also are able to work.

Another difficulty we find is to get farmers who are willing to pay sufficient wages. I think the Government has been wise in putting a scale of from $10 to $12 per month for the first year.

One man came to me and said, "I would like a young man eighteen or twenty." I asked him to fill out his application, and state what wages he would pay and received the startling reply he would like to start him on $6 per month. I told him he could not get a boy to drive cows for that. He said he thought possibly the man he would get would be no good. I

said he would not be any good if he was not worth more than $6 per month, and then asked him how long he thought he would stay for that wage if he were any good at all. He might muster up courage to pull through the first month, but would hear of other men getting more and would certainly leave the first chance.

If a man shows any sense of willingness to work, learn and get on, providing he is paid reasonable wages, we find the results have been very satisfactory and very seldom have found cause for serious complaint. We have found on the whole that people have been agreeably surprised by the willingness and readiness with which the laborers have taken hold of the work.

We have in operation an excellent system of selection. Other agencies have suffered because of the want of this system. The London *Daily Telegraph*, about two years ago subscribed a sufficient sum to send out a number of families to this country. A certain number of them were put under our jurisdiction, and a certain sum of money put in our hands for us to see that they did not come to serious want. During six months I was called upon to visit two of these families, in each case twice, and during the same period of time I was not called upon to investigate any of our own families at all.

We started about two years ago with only a few officers engaged in this particular branch of our work, and at that time handled one thousand people. We have no apologies to offer for our existence, for the Salvation Army scheme is only one of the outcomes outlined in that book published by our beloved General, entitled "Darkest England and the Way Out."

Canada offers unbounded opportunities for those coming from the Old Land to make new homes for themselves in this country with its boundless resources. The Government, the steamship companies and railway companies have helped us. The second year we took out about 4,000 people, so that the first two years we took out 5,000 people. This year we started to take out 10,000, but have practically taken out 13,000.

Difficulties Met and Overcome. You will readily see that there have been many difficulties in our way. We have practically overcome them all. Two years ago we approached one of the largest steamship companies in the world and asked them to give us free passage to a conductor passing outward on their line. We pointed out that there was future business for them. They said, "Perhaps there may be, but we are not prepared to grant your request." We stated, "The day will come when you will want our business." In reply they said, "Perhaps that is so, but we will wait and see." Last summer when I was in England, our representative who does business with the steamship companies said that one of those officials said to him, "Why don't you give us more of your business?" and received the reply that we were prepared to give business to the people who met us. They said, "We are prepared to do anything for you." The representative then reminded him of the fact that the privilege of sending a conductor with the party to Canada had been denied. They saw their mistake, and were then most anxious to meet us with every possible facility to carry on our work.

Last year we chartered outright three ships, and this year had to increase the number to five. This season, at the present time, we have practically secured all space available on ships sailing from the Old Country to this, and have chartered six ships, and expect to bring out from 25,000 to 30,000.

Some people run away with the idea that there will be so many coming that they will be sure to get a man. But, when you remember that the

Grand Trunk Pacific have let contracts for three sections of their road, and have advertised for 10,000 men, we find that the demand is greater than the supply. Other countries are saying, what is good for Canada is good for us, and are offering inducements to get people to come to their part of the world.

Last season we had over 100,000 applications from people on the other side who wanted to cross over and come to Canada. Out of that number we made a careful selection of 13,000.

To my knowledge, in Western Ontario, we have had to deport only one family, and that was the case of a woman who came to this country with a good medical certificate. She took ill, and it was found that she was suffering with tuberculosis. She, with her children, were sent back by the Salvation Army.

When we charter our own ships we are able to keep temptation away from the passengers. We like to impress upon the passengers that this is the opportunity to lead a better life. When the ships sail the bar on board is closed tight. We use half of the smoking room, which is fitted up as a labor bureau. The men are put in situations while on board ship. Then we pass them on to our booking office. Their money is changed, their ticket bought on board, and they are sent direct to their destination. We also give a lecture on board, one to the saloon passengers, and one to the steerage passengers, giving them particulars of this country, and all information which will be helpful to them, also allowing them to ask questions which are answered by the officer who delivers the lecture.

Fifty per cent. of the people we bring from the Old Country come into Ontario. When I say Ontario I mean down as far as Kingston and Port Hope. But the greater bulk come this side of Toronto. And yet, we find the cry as great as ever that the people want help, and we have not been able to do anything towards supplying the demand.

I would strongly advise the farmer never to apply for thoroughly experienced men because there are very few who come. If they had a certain knowledge of farming in the Old Country they have to learn over again here. Some of these fellows have been in the militia, and can ride a horse, but you do not want them for that; you want them to drive a horse. It is not so much what the man knows as what he is willing to know. Men between twenty and thirty are good; over that age they are not so apt to pick up Canadian methods.

The Ontario Government has purchased property in Toronto and handed the same over to us to manage. That building is to be used as a Receiving Home. We receive all the Government immigrants, and our own as well. That keeps the people away from temptation. Very often they are sent to hotels; and we have had some difficulty along that line. In a short time that Home will be opened and ready to receive the first contingent. We also have a Home in Toronto where young women are received and sheltered and cared for.

The question may be asked: "What are we doing about domestic help?" It is said that the Salvation Army is bringing out people from the submerged class, but I would like to announce here that that is not correct. These girls who have been helped to a pure life are far better in their own country under the care of somebody who will take an interest in them, take them into their home, and assist them on in the world. We guarantee the average girl that comes to this country not less than $10 per month. Therefore, you can see the girl would have to be of some little consequence before she could take that wage. We have, in Toronto, many girls receiving $12,

$15, and some as high as $20 and twenty-two dollars per month, who are cooks. When we bring out forty or fifty they are gone in two hours' time after they arrive in Toronto.

We do not guarantee to secure a domestic for any person. But in some cases where a lady has advanced two-thirds of the passage—about $23—and has ordered a girl two or three months ahead, when the girl is placed with her she has two weeks' trial, and if satisfactory, she keeps the girl, who pays her mistress back at the rate of half her month's wages. But, in case the girl is unsatisfactory she is taken away and a satisfactory one found, or the money refunded, with the exception of $2.50 fee.

If you went to England you would hear nothing about British Columbia and the Northwest. But, it would be Toronto and Ontario. When you speak of Prince Edward Island, New Brunswick, and Nova Scotia, they do not know what you are talking about. Coming up the St. Lawrence we have some difficulty in making them think one side is not America and the other Canada. One man got off at Quebec and said to the man on the wharf, "Will you please tell me which door to take to get into Canada?" For fun the man said: "Take the first door and turn to your left and you are there." (Laughter.)

This year we hope to get hundreds of Scotland's sturdy sons. We find they are in great demand. The Dane, Swede, and Norwegian, also make excellent people for labor and other work. We are prepared to do everything in our power to co-operate with the Government in bringing out to this country laborers, and placing them in satisfactory situations.

Q.—What guarantee do you give your people that they will get their pay from the employers?

A.—We have found that there are a few farmers—but very few—who have played sharp tricks on some of the people. But I am pleased to say—and I think it is to the credit and honor of the people of this country—that these are rare exceptions. We find that the farmer is prepared to pay a man who works for him.

Mr. Armstrong: As an Ontario farmer, I wish to thank the Salvation Army for the help they have given us this summer. I employ three men, and give them $20 and $22 per month, board and washing included. One Highland man in particular got so familiar with the work that in one day he could plow, and it did not take him more than another day to learn to milk. They soon get adapted to our work.

CAN THE RECEIPTS FROM THE PRODUCTS OF THE AVERAGE DAIRY COW BE PROFITABLY INCREASED BY MORE GENEROUS FEEDING?

By J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa.

To the question, "Can the receipts from the product of the average dairy cow be profitably increased by more generous feeding?" I would reply, I believe they can. I believe that if the average Canadian farmer would increase the amount of food the yield from his dairy cattle would be profitably increased Now there are various modifications of that statement necessary, but I want in the first place, to prove that it can be done. I prove this primarily from the returns that we have received from herds all over Canada. As Mr. Whitley said

this afternoon, the Experimental Farm has been furnishing blank forms to farmers to keep records of the milk product of each cow, a great many of the farmers are quite willing to take the time to send in the return, and from these returns I cannot help concluding that the average cow is not sufficiently well fed. We have returns from herds that show as high as 5,000, 6,000 and even 8,000 pounds of milk per annum, and we have returns from other herds showing anywhere from 2,000 to 2,300 pounds per cow per annum. Invariably where the return is striking, I write the man who sends in the return and make enquiry about his method of feeding and other incidentals, and in almost every case they have given us the required information, and where good returns have been received we find that the man is a generous feeder, and just as invariably where very bad returns have been received, we find that the man does not feed at all, practically just keeps his cows alive. To prove this, let me cite the case of Eastern Ontario and in Quebec in general, during the past season. I have visited very many cheese factories in Quebec during the past season and have had conversations with many farmers. In the early part of the season the returns were exceedingly satisfactory; in the month of June, wherever I went in Quebec, there was a feeling of jubilation and high expectation on account of the great amount of milk available and the returns their cows were giving. In September I started out through that same district and the tune was changed. In some cases farmers were not producing enough milk to keep the factories going. Some cheese factories in the neighbourhood of Ottawa were compelled to close down on account of the scarcity of milk; in other years they had been producing sufficient milk to enable the factories to run, but this year on account of the scarcity of grass the factories had to close down. Conclusions: Lack of feed disastrous to profits.

Probably some of you know of an experiment conducted on the other side of the line which was one of the most convincing proofs of the correctness of the statement that it pays to feed cows well. The Professor of Animal Husbandry, at Cornell University, decided some years ago to carry on an experiment to determine, if it were possible, to influence the percentage of fat in the milk yield in a herd; the results I want to give you have nothing to do with the percentage of fat, I mention it to show that it came in without any particular effort being made to demonstrate this point, he went after one thing and found another. He made a journey through various districts near the University and visited the farmers. At last he came across a herd of about 30 cattle, the owner of this herd was shipping the milk product to a neighbouring city and he claimed to have an average herd. After an examination of the cattle the professor asked if he might be allowed to send a man to stay with this farmer during one year. Permission was granted, and during that year a record was kept of the milk from each cow, of both quantity and quality, and at the same time a record was kept of the fat. Valued at current prices it was found at the end of the year the herd had consumed about $28 of food. They had produced $24.50 worth of milk, showing a net loss of $3.50. At the end of the year this was shown up, and the farmer was invited to sell his herd. When he saw the returns he was pretty near willing to sell, and the herd was purchased and taken to the College barns, and for one year after the herd was generously fed, though not in my opinion wisely fed, and at the end of that year they had given $38 worth of milk, while the cost of feed instead of being $28 per head was $33, a difference of $5 in favor of the cows at the end of the year. Now the increase of $5 in the amount of food made an increase of about $13.50 in favor of the cow. That is the most conclusive

proof I have ever seen in favor of generous feeding, and is the best proof of the absolute necessity of feeding our dairy cows generously. We must use discretion and judgment, and we must get science to help us to feed well. Let me give you an experience that I had some few years ago. I took over a herd of some twenty-five head of cattle, and for one year fed them as they had been fed up to that time, a very generous ration, giving them all they would consume. At the end of that year we found these cattle had produced 5,400 pounds per head—not a very large return. Next year we got rid of two of the worst of the animals, and started in to feed, not a more generous ration, but a more suitable ration for each animal. We fed them not only according to specified rules and requirements, but also according to the taste and liking of the individuals and the result was truly astounding. At the end of the year we had returns from our cows of 6,500 pounds. One thousand one hundred pounds in favor of the cows, at the end of that second year, and what was stronger still, instead of the feed having increased in cost we had managed to decrease it, instead of costing us $39 or $40, it only cost between $37 and $38, a decrease of about $2 a head, and that is possible if you are willing to study the best methods of feeding cows. We did it by watching most carefully the increasing or diminishing returns from every animal. It is possible to feed a cow so long with one ration that you do not notice whether she is going up or down, she is not being stoked as it were to the highest pressure she will stand. You can give one cow 15 or 20 pounds of meal a day, but it is merely throwing the meal away; that cow would give much better returns from 7 or 8 or 9 pounds of meal. Some cows will do better with a little oats or perhaps a little shorts or barley. A cow is more fickle in her appetite than even the average man, and the ladies know how hard he is to feed. Of course in summer we have grass for our cattle, and this is the point to which the greatest attention should be paid. Throughout Eastern Ontario and Quebec, where the greatest dairy interests are centred, we have been urging strongly the importance of sowing green crops to be harvested and fed when grass is short. The average cow does not get enough pasture. If you vary that pasture by some other food, she will do better. I have seen cows come off first class clover pasture and eat 10, 12 or 15 pounds of ensilage. Clover is exceedingly rich in the principal constituents that go to make up a good milk ration, and if we add a little bit of ensilage or green oats or any other green feed, the cow will consume more, and I am confident that the increased food consumed will very much more than pay for itself in the way of milk. The cow's appetite is the measure of the return provided that with which the appetite is appeased is of such a character as will promote the economical production of milk particularly in summer when almost every cow is at the highest state of her productiveness. We advise feeding a small amount of meal in the summer, but there is no doubt green food is the important thing. Even foods which we consider not particularly well suited for milk production, fed along with a bit of grass have a wonderful effect upon the milk flow; green corn or sorghum or green oats, added to the grass ration, will very materially increase the milk. Vetches, peas, tares, clover and alfalfa—the more of these you can persuade your cows to eat the better chance you have of success in dairying operations. I think I have shown what I started out to prove, and if there are any questions, I shall be only too glad to answer them.

Q.—Does ensilage injure the teeth of the cattle after they have been fed on it for some years?

A.—We have cows twelve years old that have been eating ensilage all their lives and they have their teeth yet. We have individuals from

thirteen to fourteen years of age down to calves, and I know of no cases where the teeth have been injured by eating ensilage. There is no doubt that soiling is by far the most profitable system of milk production, but it requires considerable labor, and probably that is one way in which you can make the very best use of many of those gentlemen of whom Capt. McGillivray has been speaking to-night. You should sow a little rye some time in September or a little earlier, and it will come in and be ready for feeding in May. Probably the best plan which any farmer who is interested in milk production can follow is to set aside near his barn an area of 1-15th of his arable land, divide it into three parts and follow therein a regular rotation. Supposing he has 100 acres, let him set aside eight or ten acres, and upon one field of three acres sow rye, which can be harvested, and then follow it by corn, and upon the field next to it he could have peas and oats and vetches sown at the rate of about 3½ bushels per acre, and if he mixed with it about 10 lbs. of clover per acre he will have a good catch of clover. First, he will have the rye, then the first cut of clover, and that will be followed by peas and oats and vetches which should be sown in three equal parts, one as early as possible, and the next a couple of weeks later, and the next acre a couple of weeks later still, and after that is through the second crop of clover will be ready, and if not, the corn will be ready to cut, and he could start in upon that. This will be found quite sufficient to supplement the pasture for the stock that would be carried upon a hundred acre farm. Pasture is by all odds the most expensive way of feeding cattle we know of in Ontario, and it is the surest way of getting particularly low returns from the land. We have conducted at Ottawa a number of experiments on this line, and from a given area in pasture our returns have only been about $20 per acre, whereas on land that was cultivated the income has been about $35, or almost double. The only redeeming feature of pasture is the minimum quantity of labor required.

Q.—Do you improve the quality of milk by feeding the cow?

A.—What do you mean by "improve"?

Q.—Increase the per cent. of butter?

A.—No, it cannot be done.

Q.—Would you recommend feeding alfalfa?

A.—Yes, if a man has a hillside or a field that he can conveniently leave down for a number of years, he might profitably set aside a couple of acres for alfalfa. If he has a field where the water cannot lie at any season of the year for over 24 hours, and if it is in fairly good tilth he may hope to succeed with alfalfa. Alfalfa is quite as hardy as red clover provided the land is thoroughly drained in summer and winter.

Q.—Would you recommend feeding sugar beets?

A.—Sugar beets are a most excellent food for milk cows. You cannot grow quite the same weight of sugar beets as you can of mangels or sugar mangels. Under average conditions sugar beets generally fall from 5 to 8 tons below mangels.

Q.—You do not mean the commercial sugar beet, but what they call The Royal Giant Sugar Beet?

A.—That is what I mean.

Q.—Is bran at $20.00 a ton profitable for feeding cows?

A.—With milk at the present prices, bran at $20.00 a ton may be profitably fed to dairy cows. Of course you will have to consider what the other parts of the ration are going to be.

Q.—Would it be profitable to sell wheat at 70c. a bushel and buy bran at $20.00 a ton?

A.—Yes, wheat is not particularly well suited for milk production; bran is very much better.

Q.—Would it pay to sell peas at 70c. a bushel?

A.—No, peas at 70c. are much more valuable than bran at $20.00 a ton.

Q.—What about flax seed meal?

A.—That is much too expensive to feed to dairy cows. It is exceedingly rich in fat, and we want something rich in flesh forming constituents. Ground oil cake is one of the best feeds you can get. It is superior to peas. Flax seed meal is very expensive, and is not as good as peas for milk production; a little bit of it is all right, it has some medicinal qualities.

Q.—What experience have you had with the common white field bean?

A.—I have had no experience, but I would say it would have very great value. I have seen beans fed in the old country where they are looked upon with much favor.

Q.—Do you ever feed gluten meal?

A.—Yes; in large quantities, and have been pleased with it, but I do not consider it quite as satisfactory as oil meal. We are carrying on an experiment now comparing groups of cows fed on gluten, oil meal and cotton seed meal, and upon bran and oats, and I hope another year to be able to give you something interesting on that line.

Q.—Would it be good to mix with oat chop and barley?

A.—It would; gluten is a very indefinite term, at the present time. Is it gluten feed or gluten meal?

Q.—Gluten meal?

A.—Is that the name on the bag?

Q.—I could not say as to that. There is a little circular in the mouth of every sack. A neighbor of mine sent and got a car load, and quite a number of us joined in with him and took this carload.

A.—Is it like corn meal, heavy granular stuff? If it is gluten meal it has a very high feeding value nearly equal to ground oil cake.

Q.—Is that for feeding dairy cows or beef production?

A.—Either, sir, we have fed it to beef and to dairy cows with very satisfactory results in both cases.

Q.—Would you supplement pea meal with gluten?

A.— No. Pea meal might take the place of gluten, but I do not know that it is any better. Pea meal has almost gone out of use with us in the east, because peas are simply out of sight. We cannot buy them all at short of about $1 a bushel, and there is no use trying to feed them at that price.

Q.—Cannot they be successfully grown with oats?

A.—Grown and ground with oats they do very well indeed.

Q.—Would you advise feeding that gluten meal and pea meal with oat chop?

A.—No, I would not advise feeding gluten meal and pea meal at the same time, feed one or the other. Of course you might feed a small amount of each, it would vary the ration; and the cow likes variety. You might give a cow 5 or 6 lbs. of meal, and it would hardly eat it up in a day; but if you gave her 6 or 8 lbs. of pea meal and bran and oats and shorts she would eat twice as much.

Q.—When is the best time to have a cow calve in order to get the most milk?

A.—You would get the most milk from the cow by having her calve in one of the autumn months. A certain cow in our herd calved in November, and during December, January and March, she has given about 1,000

lbs. of milk a month. In April and May, she dropped to 900 and 800 respectively. In June when she went on to fresh grass she went up to 1,000; in July she began to fall again, and that shows the effect of grass upon the milk production, and for that reason I think the very best thing you can do is to have them calve in the fall.

Q.—How much ensilage do you recommend to feed per day?

A.—I would recommend to give all you can, all the cow will eat up clean, and give her the amount of meal you feel she ought to have. If a cow gives 30 lbs. milk, give her 6 or 7 lbs. of meal, and all the ensilage she will eat, probably 45 lbs. There is no danger of overdoing it if you give the right amount of meal and a little hay.

Q.—Some years ago, we were sending milk to the cheese factory, and some of the farmers were feeding the cows on green rye, and they sent the milk back, as they claimed it colored it and made it smell.

A.—Green rye if fed in very large quantities will do that just the same as rape and turnips. The only excuse for feeding rye is that it is the earliest food you can get in the spring, and it will have an effect on the quantity of the milk.

Q.—You get the customers used to it, and they do not notice it.

A.—That is the very idea.

THE PRACTICABILITY OF THE MILKING MACHINE.

By H. H. Dean, Professor of Dairy Husbandry, O.A.C., Guelph.

To show you the interest that has been taken in this question it is said that over 130 patents have been taken out in the United States since 1872.

Before we can understand this question we must know something about the physiological processes that go on in the secretion of milk. The secretion of milk is a mystery so far as we know. We believe the milk is partly made by the breaking up of the cells, which make up the cow's udder, and partly by filtration from the blood. Some scientists say that a ferment in the cow's udder produces milk. It is altogether likely it is the result of the first two processes combined—the breaking up of the cells of the udder, and the filtration from the blood.

So far as I can see there is no reason why cows might not be milked satisfactorily by machinery.

In the mechanical problem three questions have presented themselves. Shall we milk cows by sucking, as the calf does, or shall we do it by pressure, the hand method of milking; or combine these two?

If I were to offer a personal opinion, my judgment would lead me to conclude that the successful milking machine will be one which imitates hand milking. Why do I think so? Because all the best dairy cows that the world has seen produced have been developed by hand milking, and not by calf sucking, and the tendency is that in every case where the calf sucks the cow dries up much quicker than when she is milked by hand; therefore I say I look for the development of the milking machine that imitates the hand milking of the cow.

A milking machine, to be of service, must be simple, cheap, durable, easily cleaned, require a minimum amount of power, time and labor to operate it, and a person must be able to milk from four to six cows at once. These are what I consider essential things in the mechanical milking

machine. At the College we have had practical experience with three or four different kinds of milking machines. I have, personally, taken a great interest in this question. Any man who approaches a subject of this kind should approach it free from bias as far as possible. He ought not to have any set opinions. If I have had any bias at all it has been in favor of the milking machine. The first machine which we had any experience with was called the Murchland. We experimented with this machine until we were satisfied it was not a practicable machine for milking cows, and we threw it to one side. I had the pleasure of meeting Mr. Murchland last year at Glasgow at the Highland Show. I had met him twelve or thirteen years ago, and at that time he was very enthusiastic about the machine, but, when I saw him at Glasgow last year, he was not quite so enthusiastic.

The next machine we had a practical experience with was the Thistle. I have here the milk cup of that machine. You will notice that the inside of the cup is like a calf's mouth. There are two lips and a piece like the tongue of the calf, and it is supposed to imitate both hand milking and calf sucking, so that the cow would think she was being milked by hand and sucked by a calf. The difficulty was with the cleaning of that machine, and after spending a good deal of time and money, we laid that to one side.

The next machine we had experience with was a sort of roller, or rather four rolls and a rubber flange, and you set this up under the cow and turned the crank, and these rollers pressed against the cow's teat and squeezed the milk out. That would be all right if all cows' teats were exactly the same size and hung exactly the same length from the cow's udder; but as they do not, the machine was not a success.

The next machine was the B. L. K. Milker, I have one of them here, for milking two cows at once. First the air is exhausted from the pipes above the cows, and then these cups are put on the cow's teats. As soon as the cow's teat is inserted in there, the pressure of the atmosphere, being taken off, the milk at once begins to flow. There is a sight glass which enables you to see the milk as it passes into the machine. On top of the machine there is a regulating valve which gives an alternating pressure. That is, the pressure is not constant as it was in the case of the Murchland. You have a pressure equal to about half the atmosphere coming on the cow's teat, and by means of this valve, a certain amount of air is allowed to come in. The milk comes down into the teat, and from there into the cup, and down into the pail. We have tried to give every consideration to the machine, and I would like to mention, at this time, my personal indebtedness to Mr. Wood, our herdsman, for the large amount of time, and the care and patience he has exercised in the operation of the machine. Personally, I have not had time to look after the machine. Also, I am not mechanically inclined, and I would not go to the bother of fussing with the machine in the way that he has done. We put the machine in our stable at a cost of about $250.00, or at about half the regular price of the machine. The manufactory gave us a cut rate on the machine. We began operating it on the 1st of January, 1906, and we have had 11½ months experience with it. During the month of December, 1905, fifteen cows were milked by hand and in January the same cows were milked with the machine. They gave in January, 1,351 lbs. less milk, when milked with the machine, than they did in the month of December, when milked by hand. They gave 47.22 lbs less milk fat, equal to about 55lbs. of butter or 3½ lbs. less butter per cow during that month, when milked with the machine, than they did in the month of December, when milked by hand. We expected that. After milking them during the month of January with the machine, on the 1st

of February we selected four cows to make a special test, and they were milked from the 1st of February to the 14th with the machine, and from the 14th by hand. For the period from February 1st to the 14th, and from March 1st to the 14th, when they were milked by the machine, we found that the average production per cow was 483.7 lbs., and when they were milked by hand, from February 15th to the 28th, and March 15th to the 30th, the average production was 503.5 lbs. per cow. Three out of four cows gave more milk when milked by hand than they did when milked with the machine. In nearly every group we had certain cows that seemed to milk as well with the machine as by hand. The four cows, during the two weeks, gave 79 lbs. more milk, and 6.89 lbs. more fat when milked by hand than they did when milked with the machine.

From March 30th to May 10th three cows were selected and these cows gave 80 lbs. more milk when milked with the machine, than they did in the two weeks, when milked by hand, and we were quite well satisfied, at that time, that the machine was giving us fairly good results, and for a long time we allowed the machine to milk practically all our cows. I was, personally, very much pleased with the results, but about the 1st of July, we found that a number of our cows were dropping rapidly in the milk, and we were obliged to take several cows off the machine and milk them by hand, because they would have dried up altogether. I am not going to make any positive statements, because the man who makes the most positive statements about things is the man who often knows least about them. The man who studies a question of this kind needs to be very careful.

When the cows were on pasture we made a similar experiment, to the experiment made in the winter, and they gave 7½ gallons more milk by hand than they did when milked with the machine. Five cows gave more milk when milked by hand, and two cows gave less milk than they did when milked by the machine. There were four cows that were being milked by hand during all this time. In order to compare the results got from the machine, as to the effect of advancing lactation, these four cows which had been milked all the time by hand gave 154 lbs. more milk during this machine period, showing that, in all probability, the machines were not doing as good work as hand milking in maintaining the flow.

In the middle of October we wrote for an expert to come and tell us if we could get any better results from our machine. We were not satisfied. He recommended manipulating the cow's udders. I am satisfied there is little, or nothing, in the manipulation of the cow's udder, and you will notice that, in the majority of cases, when you begin manipulating that the cows will at once contract the muscles of the abdomen. Some say that the muscles of the abdomen have no connection whatever with the ducts where the milk is secreted. My own impression is that the cow can close these ducts, and she usually does it by contracting the muscles of the abdomen. We made some experiments to see whether we could produce better results by manipulation of the udder, and in order to do that, we milked some of the cows with the machine and manipulation, and some by hand, and we came to the conclusion that there was little or nothing in the manipulation of the udder, except it seemed to prevent getting the strippings after you stopped milking with the machine. On the 1st of November ten cows were again put on an experiment for two weeks. Eight out of the ten gave more milk by hand, and one gave the same amount by hand as with the machine, and one gave less milk when milked by hand. Certain cows in every group seem to give as good results with the machine as by hand.

Summing up the whole question of the experiment in November, we find that the cows gave 384 lbs. less milk with the machine during the same time that they milked by hand. We find that, comparing inexperienced milkers with the machine, there was not very much difference. Our herdsman is an expert milker, and he can always get from two to five pounds more milk out of a cow by hand than with the machine, and usually, from one to three pounds more than an inexperienced milker can get, and this would lead us to believe that it is possible you might get as good results from the machine as you would get from a person inexperienced as a milker.

My conclusions are: 1. In the four comparative tests which we have made, three out of four cows gave more milk when milked by hand than they did with the machine. In one test they gave more with the machine than they did with hand.

2. Inexperienced milkers may get no more milk from the cows, for a short period, than is got with the machine, but a good hand milker will always get more milk than will the machine.

3. Cows tend to dry more quickly when milked with the machine. No. 15, in 1905, milked for 320 days; in 1906, 230 days, or nearly 100 days less when milked with the machine. No. 17 milked 301 days in 1905, and 217 days in 1906. No. 66 milked 287 days in 1905, and 233 days in 1906. We estimated that the cows in our herd gave 10,118 lbs. less milk, when milked by the machine, than by hand, and that amount of milk was worth, at least, $100.00.

We have certain young cows, heifers, that had hardly ever been milked by hand, and they gave us very good results. We have one two year old heifer that has milked this whole year with the machine, that has given us over 8,000 lbs. of milk. This leads us to believe that it is possible that young cows, if they were milked with the machine from the start, might give satisfactory results. Our experience leads us to believe that the most satisfactory results are likely to be got from young cows that have never been milked by hand.

Special care is needed in the cleaning of the machine. We followed the directions of the manufacturer as closely as we could, and I have no hesitation in saying that the directions given by the manufacturer will not clean the machine. They must have more care than is recommended by the manufacturer, to get them ordinarily clean, and to keep them bacteriologically clean. Most of the parts that come in contact with the milk must be boiled once a week, and they ought to be boiled every day.

So far as I can see, at the present time, it will not pay a man having from ten to twenty-five cows to invest $500 in a milking machine. The man who is milking from fifty to seventy-five cows may very well consider the milking machine question, especially if he finds it difficult to get suitable hand labor.

Q.—How was it some cows gave more milk when milked with the machine than by hand?

A.—That is one of these questions that it is impossible to give a satisfactory answer to.

Q.—As probably some of you are aware, in Wisconsin some experiments have been carried on in the manipulation of the udder, and the results they report are diametrically opposed to what Prof. Dean reports. Were the methods of manipulation the same here, and, if so, how does he explain the exact opposite results?

A.—So far as I remember the results got at Wisconsin and Cornell were slightly in favor of manipulation. In talking over this matter with Prof. Woll, he was not enthusiastic about manipulation. So far as I can see, there is nothing in the manipulation of the udder, and any of you who wish to try it at home should note the effect upon the cow, especially with a nervous cow. Just the moment you begin it you will notice the abdominal muscles contract, and with the majority of cows they will not give their milk down so well as if manipulation be not followed.

Q.—Taking into consideration the labor necessary to clean this machine, is it a labor saver?

A.—With a large number of cows, yes; but with a small number, no.

SELECTION OF A DAIRY SIRE.

By R. S. Stevenson, Ancaster.

I am sorry this subject has not fallen into better hands. It is easier to pick out a bull for production of beef than it is for the production of a dairy cow; the machinery for the production of the milk is all inside of the animal. The average production of the cows of Ontario is only some three thousand pounds of milk per year, and if you will figure up what that comes to, you will find that it will only produce enough money to pay for the feed of the cow, and there must be a great many cows that are not even giving three thousand pounds. I think it is up to the dairymen to try and improve the milk capacity of our cows. We keep on feeding these cows just for fun. We would be better off if we would get rid of them. How are we going to improve? The great basis for improvement of our dairy cattle must come from the sire. Of course the wealthy man might go out and be able to buy a number of good profitable cows, but that does not apply to the ordinary farmer. There is nothing to prevent us from improving our herds by breeding. If you want to improve your dairy herds, it will not do to pick out a beef type of bull. We have to look at the pedigree of the dairy bull. He may be a pure bred bull, and a good individual to look at, but that is not sufficient. We have got to know what kind of a mother he came from. We want to find out that he came from a producing cow, and the further back you go in tracing that bull, to see whether he came from producing cows, the more likely he is to be a bull that will get you good cows. The bull cannot transmit something to his off-spring that he has not got himself. You must not be led away by the fact that he is a handsome individual.

There are breeders, especially on the other side, who keep a bull especially for show purposes, and keep another bull for breeding purposes; simply because this show bull has not come from a line of producing cows. Another thing that you ought to know is that your bull comes from a cow that had a perfect udder. If you breed from a bull whose dam was defective in the udder, the probabilities are that a large number of that bull's daughters will go wrong in the udder. It has been found out, within the last few years, that a bull has a great deal to do with the quality and shape of the udders of his daughters. You should also see that he comes from a free milking cow, and not a tough milking cow, because we know that a tough milking cow is an abomination. In selecting a bull, I would also examine him to see that he had four well placed rudimentary teats, and see that they are well placed, that is, wide apart. A bull that has that

formation is more likely to get you cows that will have nicely shaped udders. We are trying to breed our dairy cows with an udder that has a long attachment to the abdomen; that is desirable for two or three reasons. If you have cows with low udders, they are objectionable, especially if the cows have a trick of standing down in the gutter of the stable, because the udder gets in contact with their dirty feet, and they have to be washed before you can milk.

I like a bull with masculine appearance, as a bull with a good masculine head, is more likely to be a prepotent sire. I think it is an objection to have a bull with a cow's head. I like a bull with lots of life and energy. I think we are running our stock down in this country, simply from the fact that we are breeding continually from young bulls. I think it is a great mistake. W should be governed by nature in these things. We know that our native deer are as good as they were years ago. How does nature manage that?

In the state of nature the male has got to fight for the possession of the female, and the biggest, strongest, and most robust male has got the females all around him. It might be well to breed from a young bull occasionally. It is hard to sell an old bull, and the result is that a bull is used a couple of years, and then he is turned to the butcher. In a great many instances, the young bull is bred to a young female, and I am quite satisfied that it is against the laws of nature. There are often chances to buy a good old bull, and you can generally buy them a great deal cheaper than you can a young bull. With a mature bull you can easily know what kind of stock he is going to get, because his work is there to show for it. A good many people are afraid to buy an old bull, because they think he will be cross. For my part, I think all bulls are cross, and that is the only safe way to treat them You generally find it is the quiet pet bull that kills the man.

Q.—Would you recommend an old bull?

A.—It would depend a great deal how he had been used when he was young. There are a great many of our bulls almost impotent when they are four years old, because they were worked to death when they were two years old. A bull that is properly used should be good until nine or ten years old.

Prof. GRISDALE: You judge a good deal?

A.—I have done a little at it.

Q.—You said in the course of your remarks, that a very common practice was for breeders to keep what they call a show bull, and to use another for breeding purposes. What do you mean by a show bull?

A.—There are several breeders on the other side that are in the habit of doing that. A show bull is a bull that fills the eyes of the judges and the public.

Q.—Why should he fill the eyes of the judges?

A.—That is what I would like to know. There is something wrong about it; it is not right, but it is done.

Q.—Do you think you could distinguish a bull that could breed a good dairy stock, could you pick them out?

A.—No, sir; not on his appearance.

Q.—What would guide you in selecting this bull?

A.—I say it is the most difficult thing in the world to go to pick out a dairy bull from his appearance. I do not think any man can do it. You have got to know that he comes from a producing female.

Q.—Can you be guided by general confirmation?

A.—You can, to a certain extent.

Q.—You think, when a man goes in the ring to place a number of bulls, it is a pure gamble?

A.—As far as getting good producers is concerned, it is. He has got to know the bull has got the power in him.

Q.—According to that, we might as well leave our dairy bulls at home?

A.—That is my belief.

Q.—Is there anything in a bull that would indicate his power to transmit his likeness on his off-spring?

A.—There is nothing certain, we do not want him with beefy quarters.

Q.—Are you in favor of using pure bred bulls in every case?

A.—Certainly; I never dreamed of using anything but a pure bred bull; because if you breed from a grade, you are more apt to get an inferior animal.

Q.—Do you permit your stock bull to serve your grade cows?

A.—Yes.

HOW TO KEEP COW RECORDS. (ILLUSTRATED.)

By C. F. Whitley, Dairy Commissioner's Branch, Dominion Department of Agriculture, Ottawa.

The question of keeping cow records is of great importance to every farmer keeping dairy cows. Everyone will admit that dairying is a progressive science; we know more than we did this time twelve months ago, and we should always be seeking to improve our methods in connection with this great business. The man who is going to make the greatest success with his dairy herd is the man who keeps cow records. They are also valuable to the breeder, the man who wishes to sell dairy cows on their certified record of milk production. It is a live question, this improving the record of the average cheese factory and creamery herd by the system of keeping monthly records. There is no doubt but that the man who keeps a record is going to be able to weed out the poor cows, to breed the very best cows, and in this way to improve his herd.

The work of organizing testing associations is under my charge. Dairy farmers becoming members agree to keep a record of each cow in the herd, weighing the milk night and morning three days a month, a very simple thing to do. We have a form issued free for taking the records of eighteen cows every tenth day, morning and evening; at the same time a sample of each weighing of milk is taken, and at the end of thirty days the composite samples are sent in to the testing station. In 1904 a test of this nature was conducted at Cowansville, Quebec, on the initiative of Mr. Fisher, the Minister of Agriculture, after talking with Ex-Governor Hoard of Wisconsin. "Hoard's Dairyman" has undertaken a series of "cow census" investigations, and the results, as brought home to the farmers, have been most remarkable in pointing out, not only the poor cows, but also the good ones. Mr. Fisher decided to start the work in Canada, and Cowansville was selected as the first point.

Last year we bent our energies towards further organization, and we now have sixteen associations in Ontario and Quebec. We have three in Ontario, one near Ingersoll, one at Brockville, and one at Princeton. These association records bring home this particular lesson, that averages as a whole are very unsatisfactory. Individual records are imperative. There

are some men whose herds showed cows running 1,300, 1,400, 1,600 lbs. of milk, while the average of the whole herd was only 918 lbs. per month. You cannot judge milk as you can something that is tangible and solid. It loses its identity immediately after it is milked. You have not something that you can touch and handle like poultry, cattle or grain: once the milk goes into the milk pail you cannot get at it to test it in any way. The only possible time is at the moment of milking each individual cow. We have found that if the record form is close by a scale, it will only take about thirty seconds to take the weight of the milk, and at the same time to open the bottle and pour in a sample for testing. Nobody can say that is too much of a chore. It is something that is absolutely imperative, because very often the poorest cow is the one that you think is doing well. The converse is true. One man showed me what he thought was his poorest heifer, one that he was intending to get rid of. He has a well selected herd of cows, but that particular one that he was going to dispose of will give him over 10,000 lbs. of milk in twelve months, if she goes on as she promises. He considers he has been abundantly well paid for all the time spent in testing, by the mere fact of keeping that one heifer.

Up near Ingersoll one herd started off with an average yield of 1,024 lbs. of milk in June; that man might have hugged himself and thought he was doing well: but there is apt to be a very rapid shrinkage in July, the average was 842 lbs; in August 660, and September 631, a shrinkage of 38 per cent. from June. A neighbor of his started off not nearly so well, but he kept up far better, and between these months the shrinkage was only 15 per cent. If the first man's yield in September had been as high in proportion, he would have had about 2,800 lbs. more milk in that month, and that means he would have had $28.00 more from the factory for that one month alone. What is the explanation of that rapid shrinkage in one case and the slow shrinkage in the other? It is principally care and feed; one man is looking after his cows in the very best way, and the other man is not feeding them as well as he ought. One man was feeding oat-chop through the whole summer, and looking after the care and comfort of his animals. He has ensilage and root crops, provides shade and abundance of water, sees that they are free from annoyance from flies, and he milks regularly at the same hour morning and evening.

In the association at Brockville we have two men of the same name and not of exactly the same methods; one keeps six cows, and in five months of this year, from May to September, he had a total yield of 30,984 lbs.; but a neighbor milking twelve cows, double the number, only got a small fraction more milk in the same time. Energy going to waste!

A Member: Were these two herds in about the same time of lactation?

A.—Just about.

Q.—That would make quite a difference?

A.—Yes, it would. I am almost sure all these cows calved about the same time in the spring; they were practically in the same condition.

Mr. Whitley here illustrated from charts the difference in herds, how a greater yield could be secured by proper care and attention to the cows, and how some men by keeping records had increased the yield of their cows to a wonderful extent. Continuing he said: We wish to form more associations. We have formed three more these last few weeks, and if any one wants any more information, I shall be glad to give it. Copies of the forms we use, the by-laws, and the bulletin we have issued on the subject I shall be very glad to send to you at any time.

Q.—Would you advise a man to feed grain?

A.—Yes, I would; one man near Ingersoll feeds grain all the year round and it pays him abundantly. The best record we have in the neighborhood of Cowansville is a man who feeds grain every month, and he is perfectly satisfied with it.

Q.—Do you mean to feed grain in the summer when the cows are on the grass?

A.—Yes.

Q.—How do you do that?

A.—I generally do that while we are milking; all dry meal.

A MEMBER: I saw a cow fed this summer dry chop in the stable while being milked, and she got quite sick, and the man believed it was from feeding too much.

The CHAIRMAN: It might possibly have been owing to the concentrated form in which it was fed.

MEMBER: It was oat-chop.

A MEMBER: We feed about 5 lbs. of pea chop a day, and after it ran out we started to feed corn-chop, and we were surprised at the difference in the flow of milk; we got 20 per cent. difference in the flow of milk from the corn-chop.

Q.—Would it pay to feed bran at $18.00 a ton?

CHAIRMAN: I know there are a great many who think they are making money, and they pay a great deal more than that for their bran.

A MEMBER: I think it would depend upon the price of their food products.

Q.—Have you had any experience in feeding alfalfa?

A.—Cattle gain on alfalfa if they get nothing else, that is, matured hay.

Q.—Has anyone had any experience in feeding alfalfa just as pasture?

A.—I have had it for hogs alone; I cut it three times. You should not wait until it gets too dry before you cut it.

Q.—Do you consider roots a substitute for bran?

The CHAIRMAN: Roots have a wholesome effect upon the physical condition of the animal.

REPORTS ON POULTRY EXHIBITS AT THE WINTER FAIR, 1906.

By J. E. BENNETT.

Barred Plymouth Rocks: At the Winter Fair, take them all round, I think they made the largest and best lot ever there. First cock, good color and grand shape, good legs and comb, tail a little ragged; second, another good bird, but darker and not such a nice blue; third, fourth and fifth, not much between them. Hens, the best lot I ever judged. First hen, a real beauty, grand color and shape; second, another fine hen, hardly ready, otherwise would run first very close. The rest of the class right up to tenth, any one of them fit to win a first. Forty-eight cockerels and a good lot, but I have seen the winner a little better. First, grand in shape, very fine in barring, off in comb and under color, but a real good one; second, another grand bird, better in comb and under color, but not yet ready; third, I like his color better than any of them, but he was off in shape,

especially very flat in breast. The rest of the class good birds, but no real high-class ones. Pullets like the hens, the best lot ever shown at the Winter Fair. First, the best pullet I think I ever handled. She was grand in every way; second, another real good one, very fine in barring and splendid color, but not as far advanced, and like the hens up to the tenth, the finest lot of pullets ever put together here, and there were lots of real good pullets left.

White Rocks: A very large class, but I did not think there was any improvement in them from last year. First cock, very white in color, not so nice in the shape of back as might be; second, another very fine bird, but not quite so white; third, not any too large. There was one very fine old cock with a little off color in wing that would have stood well up if this fault had not been there. It seemed very hard to get them free, so many with the cream or yellow in them. White hens, a little better than the cocks. First, a real good one, grand shape, fine in comb, and a real good white color; second, another very fine hen, but not in the condition of first; third, very white and nice shape, but looked small with the other ones. Rest of winners very good. Cockerels, a very large class. First, a real dandy, far ahead of anything else in the class, grand in shape and good in legs, and as white as a lily; second, another very white bird, but not filled out yet, should make a good one; third, another good one in color, but will never be too large. Quite a few with cream and not ready yet. Pullets like the cockerels. First and second, to real good ones, and not much to choose between them. First, a little larger; third, fourth and fifth, very good birds, and would be winners if the others were away from them. This was the best class in the White Rocks.

Buff Rocks: A larger class than last year, and very good birds among them. First cock, a real bluff, very even in color, rather rough in comb; second, another very nice colored one, but not yet ready. First hen, good in shape and very even in color; second, fair; cockerels a large class, but outside of first there were no real good ones. First was an excellent bird all over. He was far the best of all the Buff Rocks, he was a nice golden buff from head to tail, grand shape with good legs; second, nice in color, but young; third, fair. First and second pullets very nice; would like to see the buff rock breeders try to get them more even in color.

American Dominiques: Far better than last year, but still want a lot of improvement. First cock, one of the best, both in shape and color, I have seen in a long time; first cockerel fair, but high up in legs. Rest of the class very fair.

By Mr. L. G. Jarvis.

Polish: I have seen a larger entry of Polands at former exhibitions, but for quality, I think, taking all varieties into consideration, they were up to former shows held under the same auspices. I handled every bird very carefully, comparing them in the same light, side by side, and to the best of my ability placed the ribbons where they rightfully belonged. In this class I do not think it necessary to explain the difference between the first and second prize specimens, as the entry is small in each variety, probably only two pairs of old and two pairs of young being entered in each variety.

Dorkings, Silver Grey: A very fine exhibit, the best I have seen for years. First cock a grand one, silvery white, with lustrous black on breast and body color, nice comb, in shape all Dorking. Second, good shape, large, but striped a little too heavily in hackle and saddle, body color good.

Third, a good bird, not as stout in frame as 2nd, hardly as clean in color. First hen a nice one, beautiful color, great size, hard to find fault in any section. Second, not as clean in color, a trifle "bricky" on wing. Third, a trifle dark in plumage. First cockerel very fine, good comb, grand color, extra large with well developed body. Second, well up to first in color, not as prominent in breast shape, or as lustrous black in breast and body color. Third, hardly developed, fair color, will show better when more matured. First pullet extra fine in color, could not fault her in shape, wins easy. Second, not as good in color or shape. Third, good shape, but a little dark in color of plumage.

Colored Dorkings: Not as large an entry as last year, but some very fine birds shown. First cock, nice condition, fair color. Second, not in good show condition in several sections, might show better later in season. Third, fair. First hen good color, grand shape, an easy winner. Second, not as nice in color as first, fair shape. Third, fair. First cockerel good one, wins easy. Second, lacks shape. First pullet, good color, not large. Second, too high in color of neck, very fair in shape.

White Dorkings: First cock, good condition, good shape, could be a little whiter in color. Second, a larger bird but not in as good condition as first. First hen in fair condition, hardly as deep in body shape as we should like. First cock wins over 2nd in condition. Nothing special to mention in chicks, not up to quality of former exhibits.

Houdans: First cock, very even in mottling, good crest and beard, great depth of body, stood well on legs, well toed; second, as good in shape, but too dark in several sections; third, not as distinct in mottling. First hen, a good one, very even in color, white very distinct from black, good crest and head; second, hardly as even or as strong in color; third, smaller, off in color and primaries; first cockerel very evenly mottled, free from purple in black, good size, well toed; second, two dark in several sections, will make a better cock; third, about equal to second, but still darker; first pullet a nice one, in color hard to fault; second, lacked depth in color; third, not even in mottling. The finest pair, apparently, without handling not placed as they had feathers on shanks.

Creve Coeurs: First cock a nice one, lustrous black, good crest and beard; second, not as rich in plumage; first hen, good color; second not quite as good in color; first cockerel, good color; fine crest and beard; second not as good in color.

La Fleche: A small entry, first cock a good one, rich in color; second, lacked in color to first; first hen good color, nice comb, an easy winner; second, quite purple in plumage; chicks hardly matured, only medium in quality.

A. O. V. Fowls Class: A large entry, being chiefly made up of Silver Pencilled Wyandottes, and some extra fine specimens of this variety were on exhibition. An unnoticed pullet, being cooped away from the others, would have been in the money if seen at the time we were judging the class, but book had been closed, and when my attention was called to the mistake I mentioned the matter to Rev. Mr. Bartlett, the owner, who good naturedly allowed the ribbons to remain where placed—he had already won well in the class.

Toulouse Geese: A grand exhibit. I found three old pairs entered as young, so had to throw them out. I might say for the information of those that exhibit that variety of geese that you cannot produce a prominent "dewlap" throat appendage the first year, so it is very easy to distinguish the old from the young birds.

Ebden Geese: A large entry, competition keen. Nearly all the birds in class in fine condition.

Chinese Geese: Not a large entry but a few good ones.

A. O. V. Geese: Made up chiefly of African, was a very interesting class, winners extra fine.

Ducks: I might say that it was very difficult for me to handle the ducks, placed as they were, many of them in coops sitting on the floor and much too deep, as when they were at the back of the coop it was very hard to get their true color, and to get them out required a good deal of work, and not of the cleanest kind, as ducks are bound to soil the coops more or less, no matter what care has been taken to prevent it. I hope I succeeded in placing the awards fairly satisfactory, considering the difficulty in which I was placed. Rouen,—A nice class, the best we have seen for some time. I saw in the winning males a great improvement in breast color, more depth to the claret, and free from frosting. Cayuga,—A very nice class, winners showing great richness in color of plumage, carrying that lustrous green sheen with black bills. By closely comparing them I think I placed the prizes where they rightfully belonged.

Pekin: A very large class. I cannot say that quality, on the whole, was quite up to last year, yet we had a few extra specimens, in the 1st winners, I think equal with last year.

A. O. V. Ducks: Made up of different varieties, Mandarin, white top knot, wood and call. Another variety not yet admitted to the Standard, buff Orpington. Like all new breeds of fowl it will take some time yet to perfect them, to make them all buff throughout, but when perfected will be no doubt a very handsome duck, good size, and will come in with the utility varieties. I hope Mrs. Dawson may succeed in securing the desired end, and when brought to a uniform buff, that, like the Indian Runners, receive at the hands of the Standard makers, the same consideration as other varieties have in the past.

Muscovy. A nice entry made up of colored and white, colored predominating both in quality and quantity.

By Wm. McNeil, London.

Black Javas: Not a big class but they were good. First cock, good shape, fine in color; 1st hen, splendid shape, good color; 2nd, close up. First cockerel, a good one, good color, fine comb, a little short in back; 2nd close up. First pullet, a nice one, good head and comb, splendid in color; 2nd fair.

Mottled Javas: 1st cock, good head and comb, nice length of back, good shape and color. First hen, nice head and comb, good length of back, well mottled, grand in color; 2nd, a fair hen. First cockerel a good head and comb, nice color, good shape; 2nd, close up. First pullet a good one, good head and comb, nice length of back, well mottled; 2nd and 3rd, both good.

White Minorcas: A good class in quality. First cock, good head and comb, fair ear lobes with a nice back, good length of leg and fair in color; the second hardly as good in comb, but otherwise good; 3rd a fair bird a little short on legs. First hen, splendid head and comb, good lobes, nice length of neck and back, tail well carried, good length of leg and nice color. Second a good hen, but not as good in color; 3rd hen, a fair hen, not as good in comb and lobes, balance of class close up. First cockerel with good comb, wattles and ear lobes, splendid length of back, nice tail, good length

of leg; 2nd and 3rd, close up, balance of class good. First pullet a good one, nice head and comb, good length of back, nice tail, good length of leg; 2nd and 3rd, two more good ones, close up to first, balance fair.

Andalusians: A fair class. First cock, a good bird, but hardly in show condition, medium comb and ear lobes, a little rusty in hackle, splendid back, good tail, nicely laced breast; 2nd, another fair bird, balance of class were medium, but all too dark. First hen was a nice one with good comb and ear lobes, nice neck, good back, nice tail, well laced breast; 2nd was also close up with good comb and lobes, a little dark on back, with a good laced breast, balance fair. First cockerel, a good one, splendid comb, ear lobes and wattles, nice neck, good back and tail, with a well laced breast, about the same description for 2nd and 3rd, balance of class medium. First pullet a good one, good comb, ear lobes and wattle, nice neck with a well laced back, good tail, well laced breast; 2nd and 3rd both good; balance of class fair.

Red Caps: A splendid class. First cock, good comb, wattle and ear lobes, nice neck, good back, splendid tail, good shape; 2nd, another fair bird; 3rd close up. First hen, a good big one, comb a little large, grand in color, splendid shape, and nicely spangled; 2nd, and 3rd, not good, balance of class fair. First cockerel, a nice one, fair comb, good lobes and wattle, nice neck, good back, splendid tail, good breast; 2nd, another good one, nice comb, good lobes, neck and tail and breast, balance of class good. First pullet, a nice one, nice comb, ear lobes and wattles good color, nice shape; 2nd, another good one, balance of class fair.

Sultans: First cock was a nice bird, fine crest and beard, nice shaped back, and good white with good hocks; 2nd, another good one but creamy First hen a good one, good crest and beard, nice color, good shaped back, nice length of leg, good hock. First cockerel, a nice one, fair crest, good beard, nice white, well booted; 2nd, another good one, but a little creamy. First pullet, another good one, good crest and beard, good shape and color, legs and toes well feathered; 2nd, close up.

Silkies: Good class. First cock, nice bird, fair crest, good white all over, nice leg and toe feathering; 2nd, a little out of condition. First hen, a good one, nice crest and comb, good leg and toe feathering, good in color; 2nd, another nice one. First cockerel, a grand bird, nice crest, comb not good in color, splendid plumage, with good leg and toe feathering, but a little large; 2nd not in as good show shape. First pullet, a little beauty, would do to show other than as a hen pullet; 2nd and 3rd both good, balance of class fair.

Hamburgs: A grand class, and I was more than pleased that I had the privilege of judging them. First golden spangled cock, good in symmetry, nice in color, with a good comb, wattles and fair ear lobes, neck and back grand in color, tail splendid, without any purple barring; 2nd cock, another good one, but a little too dark; 1st hen, grand in color with fine spangling; 2nd and 3rd both good ones. First cockerel, nice bird, good comb and ear lobes, splendid shape, grand hackle and saddle, with a well spangled breast carrying a grand shaped tail with good color; 2nd, another good one, but a little lighter in color. First pullet, very rich in color, with nice spangles, good head and comb, and a fair lobe, hackle and back good, tail about the right shape; 2nd and 3rd both good. Silver spangled were a fine class. First cock, fine comb and ear lobes, splendid in color, with the right shaped spangle, but hardly in show shape; 2nd another good one, wants about two weeks to be ready; 3rd, fair bird. First hen, splendid in color, good spangling, grand breast, good back color, but a little too long

for a good Hamburg; 2nd, another good one, but not in as good condition; 3rd, a fine large hen, but a little too old to show well. First cockerel, grand bird, fine comb and wattles, the right shaped spangles and a good tail; 2nd was little choice between the two; 3rd, nice little bird, but still not in the same class as first and second. First pullet is a good one, good head and comb, nice head and lobe, good neck and back, nice tail, with a grand breast, spangles hardly large enough; 2nd, a nice little pullet, with nice head and comb, good shaped spangle, but not as showy as the first; 3rd, a nice pullet, but too young, grand spangling. She will make a good hen. Golden pencilled; there was some good ones amongst them. First cock, good comb and ear lobes, and a grand tail; 2nd, a fair bird; 3rd, another medium one. First hen, a grand one, an old winner in the pink of condition; 2nd, another good hen. First and 2nd cockerels, both easy winners. Third and 4th, fair cockerels; pullets all fair, but nothing special. Silver pencilled,—1st cock, an extra good bird, in size and color, with a good comb, wattles and ear lobes, with a grand tail. This is one of the best birds I have seen for some time. Second, a fair bird, a little white in face, otherwise good. First hen easy winner, splendid head and comb, well pencilled all over; 2nd, another good one; 3rd, medium. First cockerel, very fine large bird, with grand tail, a little off on comb, but splendid on lobes, just about as good as first cock; 2nd and 3rd cockerels, both nice, but too young. First pullet, about as good as first hen; 2nd, another nice one; 3rd, very nice, but hardly pencilled up to the throat. Black Hamburgs. This was a grand class and every bird fit to win but one cockerel that had a little white on face. First cock was about the best Hamburg in style and color that I ever saw; 2nd, another good one, but a little old and too large in ear lobes. First hen a grand one, good symmetry, fine head, comb and ear lobes and a nice green black all over; 2nd, another fair hen, but a little purple. First cockerel, just about as good as first cock; 2nd, another good one, grand in color; 3rd, very fine, but a little rough on legs; 1st pullet, just about as good as 1st hen; 2nd, close up; 3rd, a fine one, but a little rough on legs. She will make a fine old hen, balance of class good enough to win.

By Richard Oke, London.

Brahmas: Light Brahmas. A big class with good quality. I noticed in a number of the old birds throughout the Asiatics that they wanted a little more time to develop length of feather, being a little raw. First cock in good fit, nice neck and saddle, sound flights and good width of back, with plenty of size; second, hardly finished, nice type, good flights neck and tail; third fails a bit in size, but a good one. First hen, typical shape, grand size, nicely laced back, well finished tail, just in prime condition to show, being very pure in her top color; second, hardly in condition of first, nice length of back, with good average flights; third, another good hen, with nicely laced neck, hardly at her best. First cockerel, a big strapping fellow of good Brahma type, nice color throughout with a well spread tail; second, fails in size and finish, yet a good one; third, close up, not very much to choose between them. I noticed in this class that several, otherwise, good birds failed sadly in flights, which kept them behind the money. First pullet, well developed, good head and neck, length of back, and well spread tail; second, good neck, nice type, fails a bit in size; third, another good one, close up. Dark Brahmas up to the average in numbers and quality. First cock, a big bird, hardly ready, nice neck and saddle, very good in his

black; second, fails somewhat in top color and fluff; third, another good cock, not so pure in color, but a good one. First hen, large, evenly pencilled throughout, good type; second and third, fail pencilling and color. First cockerel, well matured, good striping on neck and saddle, ticked a bit with white on breast, in nice condition; second, hardly finished, good, sound color, will show to better advantage with more age; third, not so good in his black. First pullet, a bit young, nice neck and top color; second, about the same type, not quite so forward; third, fails a bit in pencilling of back, and not that grey cast of those in front.

Cochins: Buff Cochins. More numerous than usual, grand quality throughout. First and second cocks a grand team, nice color and splendid length of feather, first bit better finished in tail; others close up. First hen a wonder for length and softness of feather, with a very level color throughout, all curves; second and third, typical shape, but fail somewhat in length of feather. Cockerels and pullets a strong class, and no doubt some of the top-notchers will change places with a little more age, having abundance of feather, but hardly ready. I noticed some of the forward birds in these classes fail somewhat in under-color. White Cochins rather small class, but nice quality. The first old pair will take some stopping with a little more time to finish, very pure in color. Chicks a nice class, hardly ready yet. First pullet fails in footings, but forward. Blacks a nice lot, with good color and length of feather.

Langshans: Black Langshans. Old cocks a bit raw, ample size, good color, type, but want a little time to finish. First hen grand type, color and size, in the pink of condition; second fails a bit in size, and hardly the finish of first; third a good hen, fails somewhat in color. First cockerel a bit coarse in comb and head, nice type, size and color; second and third nice style, good head points, fail a bit in size, but real good. First and second pullets well grown, grand color and type, easy the pick of the class. White Langshans, a noticeable improvement in pureness of color over former years, good type and size, the young stock being well advanced.

Orpingtons: Buff Orpingtons. Throughout the buff classes I noticed quite an improvement in uniformity of color, but an inclination to the Rock type. First cock a nice color, but fails a trifle in type. Second cock very good type, but a little light in color, nice size third, a rose comb, very good type and color, fails somewhat in size. First and second hens nice types of body, broad and low set, good feet and legs, I think in advance of former years in nearly all sections; balance of winners fails somewhat in that desired type. First cockerel a dandy, beautiful, even color throughout, of about the desired hue, nicely proportioned body of the desired type; his worst fault, according to my idea, being coarseness of head, he will take some beating at later shows if he gets there; second another fine cockerel, better in head points, but fails somewhat in development of the cockerel ahead; balance of winners nice uniform color, but fails in that desired type. First, second and third pullets very uniform in color of about the right shade, nice clean tails, and with a little more age should finish them in type; balance of winners a nice uniform lot, but hardly in a class with first, second and third. Black Orpingtons, a big class, nice type and color, an improvement over last year in nearly all sections, some models in type staged in bad light. A.O.C. comprised some real good whites and Jubilees, a nice lot through, and a decided improvement in type.

By Sharpe Butterfield, Windsor.

Partridge Cochins: Cocks, 7; a fairly good class of birds, lots of room for improvement. Cockerels, 6; first, second and third very well grown and very good specimens; first a grand bird, if shorter on legs would add greatly to his value; the class was very creditable, and from them I shall be able to say next year some really high class cock birds will be shown. Hens, 7; first a grand color and grandly pencilled, she would be a much better bird if longer in feather; second another very good bird, but not so good in pencilling; third needs more time to be at her best. Pullets, 6; first a gem, about the only thing one would ask for her to have would be longer feather; second pullet another good one, but not in it with first; third no doubt a good show pullet two months ago, but laying has taken away the gloss and finish. Still, the partridge class as a whole is much ahead of last year in quality.

Games, black reds: Cocks, 7; the whole class a grand lot of birds, and my giving my reasons, objecting to so much shawl on the necks of male birds last year, the birds are dead or they were not shown this year at the Ontario, and we must expect to see in future quite superior Standard black red Games. Hens, 10; first hen very shapely and short-feathered; second a grand hen, not quite so shapely in stern, but a real good hen; third another good hen; in fact, there was not even a middling good bird in this class, but all of good merit. Cockerels, 9; first easily the best male in black red Games, grand color, and was always standing in grand show shape; second not quite so nice anywhere, but was much of the same stamp of a bird; third rather a nice cockerel, may make a very good cock, but at present too loose in feather; balance of class very good. Pullets, 9; first a very nice short-feathered pullet; second and third very close up. In cock birds prizes had to be guided in some measure by the birds having good, sound legs to stand on. Brown reds—Cocks 6, first cock short in head compared to some placed lower down, but he had good legs and could use them; faults of second bird were too long in neck hackle-feather, and legs rather shaky; third cock easily first in everything excepting very weak, sprawling legs. Hens, 9; the whole class was very creditable, and while some had the fault of being too short on legs, otherwise I might have said there were two high class specimens, but they had to give way to birds more in accordance with Standard requirements. Cockerels, 6; just fairly good birds, the best of them not yet matured. Pullets, 4; a nice class, very creditable. Duckwings—Cocks, 5; first a very fine bird all over; second a very good bird, but not so tall or reachy; third a very nice bird, following close to second. Hens, 4; a very good class. Cockerels, 3; first a very promising bird, and so was the second, third a fair bird. Pullets, 4; a very nice class. Pyle—Cocks, 4; first an easy win; second too small and not reachy enough; third a grand bird, except leg weakness. Hens, 4; first a good color, her only fault not long enough in neck; second hen not so good in color, otherwise quite equal to first. Cockerels, 6; first a grand, promising bird, second another good bird, but was a little out of sorts; third looks like making a nice bird when matured. Pullets, first very nice color and very nicely cut away in stern, and fine in tail; second a nice pullet, but looser and broader in feather; balance of class very creditable. Indian Games—Cocks, 6; first just about as wide across the shoulders as length of back, and nice strong legs of medium length; second a very similar bird excepting comb, and breast slightly splashed; third a grand plumaged bird, but not wide enough across shoulders. Hens, 10; first hen easily the best and cleanest laced hen, a

very good all-round hen; second a little better in shape but not so good in ground color; third a very good hen; in fact all this class was very creditable. Cockerels, 11; first fully matured and a good one; second and third good birds but three months younger. A good class, hardly any of them not fit to win at any other Ontario show. But the winners at the Ontario have to be pretty choice birds. Pullets, 9; a grand class. First a very good shape, beautiful color and lacing; second a grand, shapely and fairly well pencilled pullet. Indian Games a really creditable class of birds. Sumatra Games, cocks, 4; first the grandest and much the best in saddle feathers; second and third both good birds. Hens, 4; very good hens and prizes fell to best shape and color. Cockerels, 5; a nice class. Pullets, the same; just a fair good class. Birchens, first cock a very good bird; also first hen very good in color and Standard requirements; second and third hens were so very much sunburnt about their heads it would not surprise me to hear they were imported from "Afric's sunny mountains."

In Game Bantams and ornamental Bantams I fear I shall take up a great deal of your valuable space, for much as I can say of them will only be the half truth told. When I reported to the secretary on hand, in his retiring manner, he said, "You will have your hands full of Bantams," and when I went to look at them I concluded he was right, and I thought my brains, as well as my hands, would be pretty well tired when I got through. The Bantam classes, probably the largest collection ever together, 660 in number, a great big show of themselves, and not a poor exhibition bird in the lot. And it is no easy task to place the awards on that number of birds, and see everyone when awarded were up all smiling—glad to see they were amongst the winners even if they only got a fifth in some classes. We should have more room and not have Bantams placed three tiers high, for in a great many instances birds are so nearly equal in merit that the favorable position of light and standing position often decides the award, when to reverse the places of birds in some cases would change awards. Game Bantams, black red, cocks, 7; first just a little darker in color than Standard requires, otherwise a grand shapely bird, hard and short feathered and the natural pose of the bird about 35 degrees from horizontal. An ideal shaped game or Game Bantam, after using a judging stick to have him straighten himself up, should hold that position quite a while and not, just as soon as he loses sight of the stick, stand about horizontal and his wings almost drooping like a Sebright. Those who saw the cock on the corner, first number in the class, will know now why I did not place him over the fourth. He was much the best colored cock, but the loose carriage of wings and tail made him give way to first, second and third. Hens, 16; first, second and third all high class birds, and not one a great deal better than the other. First very fine in tail, very narrow in tail feathers, and very hard and short feathered on cushion near the root of the tail. Cockerels, 9; first had a hard one to beat and that was the second. I saw the second probably twenty times during the show and he was always showing himself about perfect in shape and style, but first was not far behind him in that respect, but he had quite an advantage in wing color, neck and saddle and, though slightly striped on saddle, he was a very perfect bird and, I was told, sold at the show for $75.00; third, a grand small bird and will always be in the money if in good show shape. I could have placed a fourth and fifth to good advantage, for out of the nine you could easily say six were high class birds. Pullets, 13; first an easy winner in length of leg, small body, long neck and grand shoulders with a tail as fine as silk; second much the same, looked like two sisters; third another good one. In fact the whole class was

good. Brown reds, cocks, 5; first an easy win, but breast too much splashed, have seen better; balance of class of cocks not even lemon in their colors. Hens, 5; first very reachy and small body, she looked as if she had not shed her old feathers or would have been an easy winner; second and third a little larger and looser in body feathering. The class of hens, as a whole, was good. Cockerels, 4; first a grand young fellow and if all goes well with him he will be a fine cock for next year. As to the rest of class, some were too young to say much about, and some not good enough to say much of. Pullets, 11; first grand all over, both in color and style, grandly cut away in stern and very fine in tail and tail coverts; second and third both good pullets but not so hard in feather as first. I think the brown red pullets was the best and largest class of good ones I ever met; there were three grand ones which will be heard from again; not any fault to find with them particularly, only too young. Duckwings, cocks, 7; first just alone in his class for all around excellence; second another very good bird, but not as good in color; third another good bird; balance of class fair good birds. Hens, 6; first like first cock, an easy winner, she had the grandest of tails and very narrow in flights and very, very short in wing; second another good hen and so was the third, but looser and broader in feather; all in this class were very good. Cockerels, 6; first a fair, good bird and very good in color, which made him win; second the gem of all the Game Bantams in the show if he had had good colored wing bows, small in size, neat in every section and was always standing at an angle of 35 to 40 degrees, with the very finest of tails and perfect in tail carriage. I saw his counterpart at Wilkesbarre, Pa, in the first prize black red cock; third another grand bird, no doubt brother to the second, lacked greatly in shoulder color, otherwise a gem, for shape and finish. I have no means of knowing but feel sure first hen in this class was their mother. I left out a grand cockerel in this class for largeness of size and loose and broad long feathering. Pullets, 7; first and second no doubt sisters to second and third cockerel, small, neat and finished finely in tail; third a nice rangy pullet but broader and looser in feather. Pullets a good class. Pyles, cocks, 11; first a grand, small, evenly made bird just about perfect in every section, both in color and shape, and I hesitated whether not to award him the special for the best Bantam in the whole exhibit. He was the kind dreamt about, but seldom seen; second not so clean in color nor as distinct, but a grand bird; third, about his only fault was size, he had grown pretty large; fourth a grand little fellow but not clean enough in his white; fifth just as good as the fourth only his tail was hardly full length. This class contained seven grand cocks. Hens, 10; first and second two very short feathered reachy birds a little higher than Standard color but so much ahead in all other points entitled them to first and second; third a grand, short small bodied hen and did not show herself to the advantage of first and second; fourth a better colored hen than the three placed above her but she was softer and looser in feather. Eight out of the ten grand good hens. Cockerels, 22; more good birds in this class than I ever saw or met, not excluding the Crystal Palace. I did not expect in walking down the aisle to find such a quantity, and quality almost to throw away; first a grand poser, always in order, with a perfect tail; second black red cockerel just such another actor, always doing full duty; second a grand little fellow both in color and style, only lacks a few weeks more age to make him very interesting in any company he may chance to meet; third a peach, a gem all over, in wing, tail and finish, but not quite as distinct in his color. These three birds were so nearly equal that a judge could not have made a serious mistake in placing these three awards; fourth,

fifth and sixth right in line three grand, small birds, and should these six birds meet at our Ontario as cocks next year it looks almost as if best in condition and fit will win. The greatest class of good cockerels I guess any man ever saw, reckoning all he had ever seen in his lifetime, and I shall suggest to the Association to let me award even to the tenth, if there be so many good birds deserving. Pullets, 23. In this class color, in some measure, had to give slight way, as in the hen class, but the six winners were full of quality and each and every one full of good points. 66 Pyle Game Bantams shown at our Ontario! I am sure we all can say never such a show of high class Pyles ever was in competition.

Game, white: Well this class has made very fast progress. A few years ago we used to see some grand ones in style and finish, but the undesirable willow legs kept holding them back from first prizes. While there were fourteen birds in this class, and all grand yellow legs, not even one with a willow shading. Notable amongst them was first cockerel and first pullet, away ahead of any I have yet met, full of quality, small in size, and as short and hard in feather as the best of any other class, and we may say the class of whites was very flattering to their owners. Birchen cocks, 2: first a very nice clean colored Birchen: second, a grand bird but not quite so nicely colored. Hens, 4: first hen quite equal in general make up to the very best of Game Bantam females shown: second followed her very closely: third right close up: fourth rather on the old fashioned order. Cockerels, 8: first an easy win for style, finish and color: second and third very promising youngsters; a very good class. Pullets, 4; first an all round good one in every section; second, a good pullet, and also the third. Game Bantams, any other variety, contained some very good birds both in blacks and Indian Game. The Game Bantam classes at Guelph will long be remembered by all the competitors for 1906 was surely the banner show.

Golden Sebrights: By far the hottest class ever shown in Canada and in cocks you could easily have placed six prizes. The gem of the golden Sebrights was first prize hen, small in size, full of style with the very finest of distinct lacing and, I might say, the ground color that is so much desired. Thirty golden Sebrights make a pretty good showing. In silver Sebrights the winning cock was away high up in the silver class; in fact, there were four good ones out of five entered. Hens, 7; first on the order of first golden hen, away ahead of her class; second and third good enough to win anywhere when first hen is not in competition. Cockerels; all the the winners very high class goods; same can be said of the pullets. Black rose comb, 38 in number, and a grand class of birds, and no doubt nearly every owner thought he was sure of first prize before he left home. First cock very small and finished right from head to tail; second and third close up to him. The most good cocks and hens I ever saw together. Cockerels, first quite ahead in his class for color, large tail free from purple, with about a perfect comb and ear lobe: second a smaller bird but a gem of the first water, and so was the third. Pullets; the winner was A No. 1 for color, smallness of size, ear lobes about perfection. This is the best showing ever held at our Ontario. Bantams, white rose comb; a grand show of grandly finished birds. Cochins, white; first cock quite a small good white bird: second, a little longer and full of style. Hens, 10: first just about as round as a ball, full of Cochin qualities: second and third hens very high class. Cockerels: a grand lot were the winners, fit to meet the best anywhere. Pullets remarkably good. Buffs, cocks, first a grand colored bird, grand cushion and even and sound in color both inside and out. Hens; never placed awards on three better hens; first not a shaft in sight; second close up to her, and the same the third. Cock-

erels; first a gem, closely followed by second and third. Pullets: first probably the best buff bird in the show, a rich golden buff from head to tail and not a shaft in sight, even on the fluff; second and third better in shape and good birds, but the color was hardly so grand as first pullet. Cochin, black, 53 in number. Black Cochin Bantams, as a whole, I may venture to say, the best lot ever brought together, and the absence of white undercolor was about nil, and even the whole four winners were good enough to win anywhere. The hens were marvellous, and so many good that smallness of size and green sheen was quite a factor in awarding the prizes. Cockerels and pullets just on the same order, and surely this class of birds ought to have had better light. I am sure one thousand dollars would not buy the outfit of black Cochin Bantams. It looked to me as if Dr. Fox had sent all his very best to our Ontario show. Partridge in poorer light than the blacks, 35; cocks, 9; first alone in his class, he was small and shapely and a grand Cochin in miniature; second and third grand birds, about their only fault too large. Hens, first, second and third small, grand shapely hens, and so equal in Cochin shape that the prizes were awarded to the best pencilled, and they were three grand pencilled hens. Cockerels; first cockerel like first cock, ahead of the class a long way, a Cochin all over and very long in feather: second and third would have been good birds if smaller in appearance. Pullets; first pullet small and grandly pencilled, and with good care ought to make a grand hen; second and third larger in size, grand in cushion and pencilling. An extraordinary class for Partridge Bantam, 35 in number. White booted, a good creditable class. Japanese, not as heavy classes, but they make up in quality what they lost in quantity for they were all good ones. Polish, bearded and unbearded, have made great improvements, especially in smallness of size and snow-white plumage. Any other variety quite a large class, 31 in number, and the winners grand specimens of their different varieties. If it would not take up too much of your valuable space I might have particularized more in ornamental Bantams, for there were lots of them deserving of special mention.

By James Anderson, Guelph.

Turkeys: The exhibit of turkeys was certainly the largest and best we have ever had especially in the M. Bronze class. The entries in the Bronze class were 54, in White Holland 21, A.O.V. class 15. In the two years and over class 5 cocks and 8 hens were shown. The first prize cock was a typical Bronze turkey, fine heavy bone, beautiful plumage which shone like burnished gold. The second was a very little behind, equally as heavy a bird with beautiful strong well colored legs and good barring on his wings, but the plumage not so good as the first. The third also a good, strong bird and well marked, but not quite as large as the first or second. The fourth prize cock was the largest and heaviest bird of the lot but on account of a growth on his foot, something like Bumble foot, I could only give him fourth place. Only for that he was the largest and heaviest bird in the show and I have no doubt would have taken first place. The last year's birds numbered 6 cocks and 8 hens. The first prize bird was very fine, beautiful barring on his wings, fine heavy bone, grand colored legs and good plumage. The second also good but scarcely so fine in plumage. The third a fine bird but a little bit leggy and not so brilliant a plumage as the other two. The 4th and 5th also good. Well bred Bronze turkeys not a bad one in them. All valuable birds for breeding and not overly fat. The hens were also fine. The first hen very good fine barring on her wings and grand plumage. The second not so good in plumage, a little too much white on breast feathers. The

third, fourth and fifth are good hens and well marked but not so large as the first and second. In cockerels and pullets the entries were 13 of the former and 14 of the latter. The first prize cockerel was a grand specimen, beautiful Bronze and well colored legs, grand equally barred wings and tail. It will make a grand bird in another year. The second a little too leggy and not so good in plumage as the first, but a fine strong bone and well colored legs. The third, fourth and fifth good strong birds and though scarcely so large as the first and second will make good serviceable birds for breeding purposes.

The finest specimen of a young turkey pullet I have ever seen was the first prize in this class. She must have been hatched very early to attain such size and growth. She was well marked, fine wings, good legs and fine heavy bone, and if she lives another year she will be hard to beat. The second also good, but lacking in size and weight. The third a fine bird also. The fourth and fifth smaller birds but equally well bred and good markings. The whole 14 pullets were a fine lot. One of the finest and largest ones I had to disqualify on account of a black feather in one of her wings, no barring whatever; it was a pity to do so, as she was one of the best in the lot.

In the White Holland class there were some fine birds though not so large as I have seen them. The first old cock was a beauty, fine strong bone, and grand pure white plumage. The second good but the plumage not so good as the first and not so clean. The third, fourth and fifth fine birds but smaller and not so good in plumage. The first prize old hen was good but not as pretty a shape as the first hen last year, the feathers more loose and not so well placed. The second was even better plumage than the first but much smaller in size. The third, fourth and fifth nice well marked birds but smaller in size. The breeders of the White Holland turkey claim they do not wander away from home like the Bronze, and the flesh is more delicate and of finer quality on the table. In the A.O.V. class we had Black, Slate and Narragansett. The first old cock was a very fine specimen of the black breed, good length, wide breast and fine glossy jet black plumage. The second, a Slate, fine strong bird but the plumage not so good as the first, in fact all the Slate turkeys are deficient in plumage, black spots showing on the feathers of nearly all of them which of course should disqualify them as the standard says no black spots should appear on the wings or body. There were fewer of the Narragansett breed this year than formerly, and no buff turkey shown. The Narragansett is a very showy bird with beautiful black and white plumage, and very fine plump breast and often attains a very heavy weight and they claim they are as hardy as the Bronze. Upon the whole the exhibit of turkeys was the finest I have ever seen at our Winter Fair, and I have attended the most of them since the first one held in the Royal City of Guelph some thirty-five years ago. Some people claim they cannot raise turkeys on account of the Black Head or Roup, but in the forty years I have bred them I have never had any trouble with it. If the proper precautions are taken I think there is no danger, but as it is very infectious the best way to do is to kill the infected ones and burn or bury the carcass, and, now when turkeys are such a price, sales of young birds being made at our present show at $10 and $15 each, they are worth looking after.

By W. R. Graham, Manager Poultry Department, O.A.C., Guelph.

Utility Pens: The number of utility pens exhibited at the Winter Fair was not as large as we would have liked to have seen. The judges are somewhat at a loss to know why the Wyandotte men do not bring out exhibits of their breed. Wyandottes, Plymouth Rocks, Orpingtons and Rhode Island Reds are much talked of as general purpose farm fowl and one would think that the breeders of these varieties would make good exhibits in the utility

classes. Possibly if money were available it would be best to have a separate class for each of the above mentioned breeds: perhaps another class for any other variety and then a grand sweepstakes for the best pen in the lot. We may look for something of this kind in the future, but just how soon it will come I am not in a position to state.

The pens that were exhibited this year, I think are an improvement over last year. The first prize went to a pen of Plymouth Rocks. The cockerel at the head of this pen was, in the judges' estimation, much the best bird in the class. This bird had a long keel and exceptionally well covered.

Our experience in feeding chickens and handling dressed poultry is that if you get chickens which have well covered breast bones before they are fattened, these birds present a much finer appearance when dressed. You will often notice that there is plenty of meat at the base of the breast, but for about half an inch at the top there is simply keel bone with no meat on it. The first prize pen was good in this respect. The second prize pen—the pen of Buff Orpingtons,—was nicer in type, *i.e.*, they were nice shaped breeds and low down with fine legs. Possibly this pen would appear to be easy winners, but lacked in meat covering of the breast. Had this pen been anywhere near as well covered as the first prize pen they would have won easily.

The third prize went to a pen of White Rocks. These birds were fairly well covered, but were a little too up-standing and coarse. The other pens that were exhibited lacked in type, also in the covering of the breast bone. Some do not seem to know what we want in the utility pen. What we look for is good healthy birds of medium size, rather blocky in type with good breast development and the breast well covered with meat. The scales on the legs should not be too coarse and rough as these are usually associated with meat that is coarse and stringy.

Dressed Poultry: The exhibit of dressed poultry was not as large as has been seen in some previous years but there were quite a number of new exhibitors, which is encouraging. In conversation with some who have shown dressed poultry other years and not showing this year, their reason seemed to be that the prize money was not large enough. I realize that those who are showing live poultry believe that the dressed poultry men are getting larger prizes in proportion than those who are showing live poultry, but there is this great difference,—those who show live poultry and win prizes have considerable advertising honor which has a cash value that is hard to estimate, in the disposal of their stock. In dressed poultry, as I see it, it is a straight cash transaction. While it may be of considerable honor to win in the dressed poultry class I do not know that it has any cash value in the selling of stock, hence what an exhibitor makes is simply estimated by the cash returns that he receives. It does not take a great deal of time or money to feed the chickens, but takes considerable time to select birds that are suitable for the purpose and one wants a fairly large quantity to select those that are capable of winning. In addition to this the dressing and shipping, etc., means a lot of time and very tedious work.

If each of our best feeders was to show a number of birds in each class, my impression is that the cash returns to each man would not be very great. We have not had, except one year, very keen competition. I believe there is a little tendency on the part of the breeders, especially in the County of Wellington to give and take as it were, that is to say, if one is going to feed heavily this year, the other chap drops out.

I have been informed that if the prize money was increased we would not meet this difficulty, but at the present time I cannot see where the money is coming from to do this. There is another side of the question and that is,

if we encourage what may be termed the professional feeder, it might be at the expense of keeping out the amateur, although amateurs, or what are supposed to be amateurs, often make excellent exhibits.

In the Plymouth Rock class there were some exceptionally fine birds. Special mention might be made of the first prize cockerels and first and second prize pullets. These birds are about the ideal size, weighing between five and six pounds each, were all of very white color, and the breasts were exceptionally well covered with meat. The keel bone was long. They were well dressed and the quality of the flesh was excellent. The legs were not rough, in fact, everything indicated to a good pair of chickens. I think these are as good chickens as have ever been shown. The pullets won the sweepstakes and their closest competitors were the cockerels shown by the same exhibitor. Had there been first, second and third sweepstakes, the two pair of pullets and the pair of cockerels would have won. The other exhibits of Plymouth Rocks were fairly good, but I am inclined to believe that the feeders do not pay enough attention when selecting their birds for feeding purposes to get them well covered on the breast before starting to feed. By this I mean to get the meat extending to the very top of the breast. There were several good chickens that were nicely fattened, but lacked meat on end of the breast bone, which spoiled their appearance. In the Wyandotte class the exhibit was not very large, but the quality was fair. There was closer competition than there was in the Plymouth Rocks.

The first and second prize pair of Wyandotte cockerels won largely on the meat covering of the breast. Other birds were about as well fattened and as well dressed. The main difference being that the first and second prize pair had more meat at the end of the breast bone. There was a pair of Wyandotte chickens of nice color and good chickens, but the breasts were not well covered. These were shown by a new exhibitor. Had he taken a little more pains in the dressing of these birds and had shaped them, they would have presented a much finer appearance. It will be noticed that the judges are to be guided by the best and best dressed. It was in the dressing where these chickens failed.

In the Wyandotte pullets, the exhibit was not large and the quality was fair. One of the pullets was somewhat overdone, that is to say, she was too fat and what cattle men would call "patchy."

The Brahmas were of fair quality. It appears to me that we have not as yet had a good exhibit of Brahmas. They lack meat.

The exhibit of Cochins was only an apology. There were only a few pairs shown, and if one was to judge the market quality of Cochins by the exhibit made, he would be forced to the conclusion that they did not amount to much. They were fairly well fattened and moderately well dressed, but this is about all.

Minorcas and Andalusians: The exhibit in this class was fairly large. I have seen some fairly respectable dressed Minorcas, but this exhibit was perhaps of average quality as compared with what has been shown here in previous years. From a consumer's standpoint, they look pretty blue.

The exhibit of Leghorns was fair. First and second prize birds were of very good quality for Leghorns.

The class of Dorkings show a great improvement from year to year. There were some very nice birds shown. There was one pair, a good one, which had the appearance of being scalded, which, of course, threw them out of competition. Had these been dry plucked and nicely shaped, they were a pair of chickens deserving of special mention. The winners in the Dorking class were a good representation of the breed and made a very nice showing.

The French classes, i.e., Houdans, etc., were not out in large numbers and the birds were not matched, that is to say, there was a big one and a little one. The exhibitors in this class want to be a little more careful in dressing. There were some fairly nice chickens, but they were partially skinned through rough handling.

The Game classes were better this year than last. There were six nice Pit games shown. We got here an exceptional development of breast meat. The breast bone lacks in length. Had these chickens been better fed they would have made a better exhibit. The exhibit of games was an improvement over other years.

Orpingtons: The Orpingtons, as a class, have exceptional quality, but they have, to my mind, this weakness, that they appear rough and coarse, and there is undoubtedly a lack of meat covering on the breast bone. The competition in this class was fairly keen and where one won over another it was mostly on the amount of meat which covered the breast bones. There was a pair of pullets that were somewhat overdone—one had the appearance of having laid, and would therefore be considered a fowl.

Hamburgs: The Hamburgs were better this year than usual. When Wm. McNeill of London shows we generally see something pretty nice. He had a very nice exhibit this year, as did also Scanlon Bros. The difference in the two exhibits was about this. Scanlon Bros., were fatter on the back, but they lacked meat on the breast. Mr. McNeil's were excellent in breast development. I think the exhibits of dressed poultry that are bled have a nicer appearance than those that have pulled necks.

Turkeys: The turkey exhibit was equal to that of other years. The only improvement that I would like to see the turkey men make is in the color of the flesh. The dressed turkeys are rather yellow in color for my liking. The bulk of the prizes in this class were won by one exhibitor. Surely there are other men in the Province that have good turkeys. It almost looks as if everybody else was afraid to show.

Geese: The exhibit of geese is improving from year to year. Sometime ago Scanlon Bros., of Ennottville would win this class very easily. They won first prize this year in both white and colored birds, also the sweepstakes, but they had much closer competition than is usual. There were one or more pairs of geese, had they been as nice in color, would have been very close competitors, possibly might have beaten them out. If the exhibitors continue to improve their exhibits from year to year there is going to be something interesting in this class. The first prize birds won easily on color and on dressing.

There was probably closer competition in ducks than in any other class in the Show although the bulk of the prizes went to one man in both white and colored. This exhibitor had a show in itself. He seems to have the happy faculty of being able to get ducks of large size, well fatted with nice color and in addition to this he knows how to put them up to look nice. Judging from the conversation that I had with other exhibitors, that are new in the game, he will find harder competition next year. There was a splendid exhibit of Cayuga ducks, but these ducks were not as well dressed as the winners and were very yellow in color.

FINANCIAL STATEMENT OF THE PROVINCIAL WINTER FAIR.

Year ending January 31st, 1907.

Receipts.

Legislative grant	$7,230 00	
Legislative grant, Seed Department, 1905	129 00	
Prince of Wales Prize	50 00	
Gate receipts	1,952 35	
Net receipts from advertising in prize list	408 75	
Joseph O'Mara, grant special prize	25 00	
Dominion Shorthorn Breeders' Association grant	280 00	
Canadian Seed Growers' Association grant, prizes	126 00	
Canadian Ayrshire Breeders' Association grant	51 00	
Canadian Holstein-Friesian Breeders' Association grant	90 00	
Canadian Hereford Breeders' Association grant	19 00	
Dominion Swine Breeders' Association grant	200 00	
Milk sold from Dairy	85 08	
Dressed poultry sold	101 15	
Sale of swine carcasses	1,015 38	
Birds sold in selling class	120 00	
Fees	3,107 85	
Special cash poultry prizes	438 50	
Sale of catalogues	23 23	
Seed exhibit sold	12 85	
Miscellaneous	5 25	
Total		$15,470 39

Expenditures.

Balance due Treasurer from previous year	$ 151 07	
Directors' expenses	223 48	
Secretary's salary	500 00	
Postage and stationery	217 00	
Advertising and printing	1,419 15	
Office help, including expenses at Show	678 62	
Telegraph, telephone, express and freight on coops	117 50	
Judges, Judges' Clerks, Ring Committees	792 85	
Lectures and public meeting	375 40	
Reporting meetings, 1905 and 1906	150 00	
City of Guelph, payment for 1906	260 00	
Lighting building	169 55	
Heating building	90 00	
Swine carcasses sold	1,015 56	
Dressed poultry sold	104 50	
Birds sold, selling class	120 00	
Police service	25 00	
Milk sold	84 59	
Prizes paid	8,006 00	
General help at Show	928 50	
Block test expenses	184 05	
Lumber, hardware and shavings	70 21	
Feed and straw	121 45	
Cartage, storage and rent of chairs	38 31	
Supplies, Poultry Department	4 00	
Alterations and repairs	97 31	
Seed grain sold	12 85	
Auditor	15 00	
Miscellaneous	3 10	
Total		$15,975 05
Balance due Treasurer		504 66

Examined and found correct,
this 19th day of February, 1907.

(Signed), J. M. Duff, Auditor.

(Signed), Arthur Johnston, President.
(Signed), A. P. Westervelt, Treasurer.

ONTARIO PROVINCIAL WINTER FAIR, 1907.

OFFICERS AND COMMITTEES.

Honorary President ..... F. W. Hodson, Toronto.
President..... Arthur Johnston, Greenwood.
Vice-President ..... Lieut.-Col. R. McEwen, Byron.
Secretary-Treasurer..... A. P. Westervelt, Toronto.

Committees for 1907.

Executive Committee.

Arthur Johnston, Greenwood; Lieut.-Col. R. McEwen, Byron; Wm. McNeil, London; W. W. Ballantyne, Stratford; Wm. Jones, Zenda; A. P. Westervelt, Toronto.

Committee on Cattle.

John Bright, Myrtle; A. W. Smith, Maple Lodge; J. T. Gibson, Denfield; John M. Tyson, Guelph; W. W. Ballantyne; Jas. Bowman, Guelph.

Committee on Sheep.

John Jackson, Abingdon; Jas. Tolton, Walkerton; A. W. Smith, Maple Lodge; James Millar, Guelph; Lieut.-Col. R. McEwen.

Committee on Swine.

Wm. Jones, Zenda; Prof. G. E. Day, Guelph; G. B. Hood, Guelph; R. H. Harding, Thorndale; John Barber, Guelph.

Dairy Committee.

W. W. Ballantyne, Stratford; Prof. H. H. Dean, Guelph; John Bright, Myrtle; John McKee, Norwich.

Poultry Committee.

Wm. McNeil, London; A. W. Tyson, Guelph; W. R. Graham, Guelph; R. Oke, London; J. H. Saunders, London.

Judging Competition Committee.

Prof. G. E. Day; John T. Gibson; J. E. Brethour; John Jackson; W. W. Ballantyne; Lieut-.Col. R. McEwen; H. S. Arkell.

Seed Committee.

G. A. Putnam; Prof. C. A. Zavitz, Guelph; L. H. Newman, Ottawa; John Barber; G. B. Hood.

Reception Committee.

J. P. Downey, M.P.P., Guelph; Hon. Nelson Monteith; Hon. John Dryden; Dr. J. G. Rutherford, Ottawa; A. W. Smith, Maple Lodge; President G. C. Creelman; Mayor Neustadt; A. F. H. Jones; J. M. Duff; Lieut.-Col. R. McEwen; A. W. Tyson; A. Guthrie, M.P.; J. M. Struthers.

Superintendent of Buildings: D. G. Hanmer, Mt. Vernon.

Assistant Superintendent: J. H. Saunders, London.

Committee in charge of Rings.

Cattle: A. W. Smith, John Bright, J. T. Gibson.
Sheep: Jas. Tolton, John Jackson, Lieut.-Col. R. McEwen.
Swine: Major G. B. Hood, John Barber, Wm. Jones, R. H. Harding.
Dairy: W. W. Ballantyne.
Judging Competition: Prof. G. E. Day, John T. Gibson, J. E. Brethour, John Jackson, W. W. Ballantyne, Lieut.-Col. R. McEwen, H. S. Arkell.

EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.

The dates for holding the show at Ottawa were March 4th to 8th.

The new building especially erected to accommodate this Show was ready in ample time for the opening. On the ground floor are permanent and roomy pens for swine and sheep, also an exhibit room for dressed carcasses and killing and boiler rooms. The first floor, to which the main entrance gives admission, is occupied by stalls for beef cattle with a separate room for dairy cattle, lecture room and general offices. The second floor makes a good show room for poultry and pet stock.

OFFICERS AND COMMITTEES.

List of officers for the Show held in March, 1907, was as follows:—

Honorary President.....F. W. Hodson, Toronto.
President.....J. C. Smith, Hintonburg.
Vice-President.....Robert Clark, Ottawa.
Sec.-Treasurer.....A. P. Westervelt, Parliament Buildings, Toronto.

Committee of Management.

The President, Vice-President and Secretary; J. H. Grisdale, Ottawa; Jno. A. Belford, Ottawa.

Board of Directors.

The President, Vice-President; J. H. Grisdale, Ottawa; A. W. Smith, Maple Lodge; J. G. Clark, N. F. Wilson, M.P., Cumberland; R. H. Harding, Thorndale; J. M. Gardhouse, Weston; T. J. Graham, Bell's Corners; David Barr, Jr., Renfrew; Jno. A. Belford, George Higman, Ottawa; W. F. Garland, Hintonburg.

Committee on Cattle.

J. G. Clark, A. H. Foster, Twin Elm; N. F. Wilson, M.P.; Thos. McDowell, Shawville, Que.; Hon. W. C. Edwards, Rockland; A. W. Smith, T. J. Graham.

Committee on Sheep.

J. H. Grisdale, J. M. Gardhouse, R. H. Harding, R. R. Sangster, Lancaster; J. Bradley, Carsonby; Andrew Cochrane, Almonte.

Committee on Swine.

R. H. Harding, J. C. Smith, R. Clark, J. H. Grisdale, Patrick Collins, Jr., Bowesville; David Barr, Jr., W. Hurdman, Hurdman's Bridge.

Dairy Committee.

J. A. Ruddick, Ottawa; J. H. Grisdale, N. Sangster, Ormstown, Que.; W. H. McNish, Lyn.

Committee on Poultry.

J. A. Belford, F. H. Gisborne, Ottawa; G. H. Higman, F. J. Blake, Almonte; V. Fortier, Ottawa; W. F. Garland, Hintonburg.

Committee on Seeds.

Warden George Boyce, B. Rothwell, F. Bradley, J. C. Stuart, G. H. Clark, L. H. Newman.

Reception Committee.

J. C. Smith, His Worship the Mayor of Ottawa, Ald. Storey, G. H. Higman.

Poultry Superintendent: R. E. McKinstrey. Ottawa.

LECTURES ON PRACTICAL SUBJECTS DELIVERED AT THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW, 1907.

Mr. C. C. James, Deputy Minister of Agriculture for Ontario, Toronto, very acceptably acted as chairman of the meetings.

THE PROPER HOUSING OF HOGS IN WINTER.

By J. E. Brethour, Burford.

I would, in the first place, state that I feel the housing of pigs is a necessary evil. Perhaps that is a strong statement to make but that has been my observation. The less housing we do in the winter time the better results in my experience do we achieve. When I say this I mean where there is a large number of pigs. I am quite willing to admit that where small numbers are kept moderate housing will give good results. But where they are kept in large numbers the more they are allowed to be in the open air the better will be the results. Many of us have observed from our own experience and while going among feeders of hogs, that there are a great many crippled pigs. This trouble is largely brought about by close confinement and possibly by feeding on very rich food. If we can keep all our stock as much in the fresh air as possible we will overcome these difficulties in the winter time. I believe that the open cabin or wigwam that is being used now largely is the most satisfactory plan of keeping hogs. These buildings should be made warm but not draugthy and should be portable if possible. By having buildings under this plan the pigs are allowed freedom. They go out and in at will taking a reasonable amount of exercise. Coming in contact with the fresh air and rain and sun in the winter keeps their skin in good condition and consequently their bodies healthy. Perhaps it is well to qualify a little these general remarks by saying that with fattening pigs, the animals that are within a month or two of finishing, of course, can be fed in enclosed pens. But the remarks I have made are largely with reference to the care of growing and breeding pigs. One difficulty we all experience I think is the raising of young pigs in large numbers. This can in a measure be overcome by following the principle of keeping each sow isolated as much as possible from the large droves of pigs. Another very satisfactory system of keeping brood sows when they farrow in winter time is to put them in a stable where cattle are kept. I believe these are ideal conditions. There seems to be an air in a stable where cattle are kept which is free from dampness that we cannot get in a pig pen. Brood sows with litters should be kept as much away from the others of the herd as possible. After the pigs are weaned, when they are two or three months old, they can be turned out. I do not know that it is necessary for me to dwell on the style of pig pens but I would like to say I have had more or less experience along that line by building a large piggery myself ventilated in every way and provided with artificial heat, but if it is at all possible I would always resort to outside pens. Another plan we are following with breeding stock is that we have a building which is about thirty feet by twenty feet. It is just a shed. It has about eight feet ceiling, covered over with rough boards with a long loft filled with straw. This plan we find is very satisfactory. The pigs sleep in this place. We have about fifty, and it is dry and comfortable, the straw seems to take away the dampness. They have access to the orchard. We feed them out in the open and provide warm food, being fed this way they are

forced to go out and take exercise. I do not know that it is necessary for me to make any other remarks unless some gentleman wishes to ask some questions.

Q.—What plan do you take of heating the food?

A.—We use steam for that. We do not boil any of the feed, just warm it. We find that with young pigs three to five months old the warm feed is more judicious and economical.

Q.—Would it pay the farmer who has only a few brood sows?

A.—I do not think it would pay in a small way to steam the food for two or three sows. But I would certainly do it if you had a large number.

Q.—Would you feed young pigs out of doors?

A.—Yes, anything over three months old. If all pigs were allowed to keep in the open air one or two hours every day you would have no difficulty with crippled pigs.

Q.—You spoke about keeping them in cow stables. Is that good for the cattle?

A.—I do not think it will cause any injury to the cattle. That is an ideal condition, a cow stable for a sow when she is nursing, but not having that, then the colony pens are the next best thing.

Q.—Would you feed brood sows with warm food before they farrow?

A.—Yes, we feed them right up to farrowing. If they are used to this feed it will not injure them. I do not think it is good to change from hot to cold or from cold to hot feed.

Q.—Would you let them out in cold weather?

A.—If a sow is used to running in and out when she is carrying her young and is used to the cold. I do not think it will hurt her in the least, but if they are kept in for a week or ten days before farrowing and then turned out they are very liable to be injured through the cold affecting their udders, causing blind teats. This is a very common occurrence and it is very often due to carelessness. I would strongly emphasize keeping them in the open air as much as possible. The more experience I have the more I am convinced that outdoors is the proper way to keep hogs.

Q.—Can you not feed them too heavily when they are carrying young?

A.—Yes, to an extent you can, but if sows have lots of exercise and freedom, we are not much afraid of giving them too much to eat.

Q.—It would not do if they were kept inside?

A.—No, the worst kind of result would follow, but it would depend on the food. I would not feed a strong food such as corn, although I have fed fifty brood sows this winter with corn, giving them mangels once a day and they are farrowing good litters. I believe that the loss of a great many young pigs is due to keeping them confined and giving too rich food.

Q.—You would rather feed your sows pretty well than starve them?

A.—By all means. I do not believe in starving them at all. If you can induce exercise with abundant food that is the proper principle.

Q.—Would you advise having a few sods in the house?

A.—I believe they should have access to the soil, it seems to counteract stomach derangements when they get at the soil.

Q.—Would you advise keeping sows with young stock apart?

A.—You should never keep a brood sow or a sow that has got young pigs in the same pen where other stock pigs are. It is not possible for them to raise young pigs where larger and stronger pigs are being kept. The brood sow should be isolated from the other pigs and the young pigs should have a place where they can have exercise.

Q.—Would you advise keeping a boar pig separate from all the others?

A.—Oh yes, that is absolutely essential.

Q.—How would you start feeding?

A.—For four or five days do not be anxious to give much feed, but after that give a mixture of oats and bran with small quantity of corn.

Q.—Would you not prefer middlings?

A.—No, because middlings are more or less constipating, and a sow starting to nurse tends to become constipated under any conditions. It is better to give them food that is inclined to be laxative.

Q.—Would you use barley and bran?

A.—I have seen the best results from linseed or oil cake mixed with barley and bran. It is all right for brood sows.

Wm. Jones, Zenda: The question of housing hogs in winter is a very important question and one that is considerably complicated. Mr. Brethour has traversed the question considerably. A simple pen and common sense feeding is about as good a method as man can devise for the proper housing of pigs in winter time. I quite agree with him that too much confinement is about the worst way you can house swine in winter in all stages of their growth. Sows when they are young have to be treated with considerable discretion and judgment both as regards feeding and housing. A dry pen with nothing but pure atmosphere in it with plenty of good dry bedding changed quite frequently, and common sense in feeding are about all the requisites I think to make swine do well, and if they won't under these conditions, I know of no way that they would. Now a pen should be as dry as possible under all circumstances. I think a perfect pen should be made pretty well all of wood and should have as little cement and stone work about it as possible. You will get in a pen of that kind a drier and purer air than in most of the others.

Q.—Mr. Brethour spoke about a straw covering for the sow. Would it not be a first rate arrangement to have a little space filled with straw between the ceiling boards?

A.—Take an ordinary frame pen and loft filled with straw. That, I think, is as good a covering as you can have.

Q.—With some space between the ceiling boards?

A.—Yes, covered over, but if you have not got straw of course a space would certainly help it.

Q.—Would there be a better system of ventilation?

A.—Ventilation is something with regard to which we might each have a system of our own. My way is to keep all foul air out of the stable and use the windows frequently. I want to have plenty of windows and plenty of light. Want them so that I can have them out altogether if I wish. If the wind is from the north I open the windows to the south. If the wind is from the east I open the windows to the west. You will get enough air in that way.

Q.—Do you think that would be rather difficult in a closed pen?

A.—No doubt, but the ventilation is a very important part of the conditions as it is with regard to any other animal.

Q.—What objection have you to a cement floor?

A.—A cement floor is always damp and cold. I have not yet seen one in a hog pen that is not that way. I would prefer to have a board floor over cement for the pig to lie on.

Q.—Would it not be better to have it elevated?

A.—I do not think it would. An elevated sleeping pen is all right, but a wooden floor four inches out of the cement gives very good results.

Q.—Do you not think a cement floor would be all right if you used plenty of straw?

A.—It would certainly be an improvement to use plenty of straw, but I would prefer to have the straw on a wooden floor.

Q.—If you had a sleeping place built up?

A.—That is all very well in its way. A great many have it. Some would have two feet up, others four inches. They are all an improvement on sleeping on a cement floor.

Q.—I suppose no matter how much straw you used the pigs would get down to the cement?

A.—They are very liable to do so.

Q.—Would it not be possible to put a raised platform for the pigs to sleep on?

A.—A raised platform is decidedly preferable to lying on cement, but speaking for myself I do not like a raised platform. I like a platform about four inches above the cement.

Q.—If as we believe the foul air settles down to the floor, pigs lying on the floor would breathe all that?

A.—Then get them outside as quickly as possible.

Q.—We find around here where the weather is very cold that it is pretty difficult to have a building where the manure won't freeze. If it is down to freezing in the building do you think it would be best to warm the feed in a heater?

A.—I would have no objection to warming the food.

The CHAIRMAN: It struck me while Mr. Brethour and Mr Jones were speaking that a great many of the questions asked and the answers given were exactly along lines that we apply to ourselves. I do not see why we can expect any animals to thrive and do well if we deny to them the very principles that we find absolutely necessary for ourselves. Exercise, fresh air, and putting ourselves in condition. These are conditions which are absolutely necessary for the proper health of our own bodies. Somebody asked, for instance, as to the foundering of pigs. We know we ourselves become foundered if we do not have fresh air, and you cannot expect hogs to do otherwise in foul air. It seems to me that we could answer a great many of those questions in connection with cattle and swine if we would apply to them the very principles as we find so necessary in connection with our own health.

THE ADVANTAGES TO EASTERN ONTARIO FARMERS OF PRODUCING A LARGER NUMBER OF HOGS SUITABLE FOR THE EXPORT BACON TRADE.

By W. H. McNISH, LYN.

I hope that no one will object to me calling you farmers, for the farmer of Canada is the man of the hour to-day. I am a farmer myself. I have been engaged to quite an extent in raising hogs and I just propose to give you the result of my experiments and observations. When a company or a corporation are contemplating any business the first thing they do is to look about to get the natural conditions as nearly perfect as possible. Now I think here in Eastern Ontario that our conditions for the production of bacon hogs are equal to any place in Canada or in fact to any place in the world.

It is essentially a dairy country. I think that point is settled. As Mr. Daniel Derbyshire, the late president of the Dairyman's Association stated at a convention in my town of Lyn a year ago, the farmers of Eastern Ontario had come to the conclusion that it was a settled fact that dairying was a business and that they are entering on that business in earnest. Well the production of bacon and dairying are twin industries. One cannot expect to attain the highest point of success in the one without the other. The dairymen must have the hogs to turn into cash an unmarketable product in order to make it pay, while the hog raiser on the other hand must have the cheap food which is on the dairy farm in order to make his business as hog raiser a success. Therefore, I think we may assume that dairying and the production of bacon are twin industries. This being a dairy country we must raise a large number of hogs. I was looking up some figures the other day and I was much surprised to find that if you grouped the eighteen counties of the Province east of Toronto, you will find that the farmers are not actually producing one pig per cow per year. Now I think this is a most lamentable condition of affairs. I think that every farmer in the Province of Ontario should sell four pigs weighing 180 to 200 pounds for every dairy cow he keeps. I was talking to a gentleman in the village of Lyn who keeps one cow, a Jersey, and he told me that in the spring he buys a pair of pigs. He turns them off in the fall and in the fall he buys another pair of pigs and turns them off in the spring; and by supplying the skim milk and buttermilk and offal from the kitchen he has two of those pigs for clear profit. I have done a little experimenting myself and I think the result of the experimenting that I have done corroborates some of the statements on the chart there. A little over a year ago I was feeding at one time 115 pigs. They were probably not under the best conditions. I had them all in one pen, and they did not have the fresh air that Mr. Brethour has recommended, but from the third day of January to the third day of February I produced pork in that pen. My pigs were probably an average lot weighing from 40 to 170 pounds and I produced pigs right in the dead of winter for two and three-quarter cents per pound for the amount of meal used, and in addition to that they had about as nearly as I can reckon, from ten to twelve pounds of skimmed milk a day. There is a chance to figure up what skimmed milk is worth. You might also figure what whey is worth. It is a very hard thing to get at the value of either whey or milk on a dairy farm. But it is my opinion that the farmers of Eastern Ontario, where we cannot hope to do anything else but dairying, should go more largely into the raising of bacon hogs. I think the farmer who has a hundred acres should turn out at least 100 pigs a year. There is nothing that he could go on with that will employ him so profitably, especially in the winter time, as keeping a good bunch of good pigs. They can do it profitably. In Essex, Kent and some of the other counties in western Ontario they are keeping four times the number of pigs per cow that we are here in Eastern Ontario. They must be doing it profitably or they would not be doing it at all. Now we here, with the advantage of having a good supply of milk and whey, certainly can produce pigs just as cheaply if not more cheaply than they can. We have here in eastern Ontario in round numbers about half a million dairy cows turning off a little less than half a million bacon hogs. Now, if we were doing as we should and could do, we would be turning off two million, and at present prices see what a handsome revenue would come into this country. The whole province is producing to-day just about one pig per dairy cow, and if we can take the whole province and produce four pigs per dairy cow, we would have a revenue at present prices of between fifty and sixty millions from hog pro-

ductions. There is no danger of glutting the market. The market seems to be getting firmer. The Americans are gradually slipping out and we should be ready to take their trade up and send over to the old country the pigs that they are sending at the present time. I think that farmers and packers should get closer together. Their interests are identically the same. There should be no hard feelings. What is for the packers' interest should be for the farmers' interest. Probably we are both to blame. The packers do not come in touch with the farmer himself. I understand that the price of hogs to-day is just a shade above the export price but whether they are exporting there is certainly a great difference in the class of hogs offered and if the farmers are going to produce the kind of pigs that are wanted for the export trade the packers will have to make up their minds that they will have to discriminate in favor of just what is needed. If one man saw that his neighbor was getting half a dollar or one dollar more per hundred for his pork he would produce the quality his neighbor was producing. If by some means or other we could get packers and producers a little closed together, get them to recognize that their interests are identically the same I do not think anything would stimulate the farmers more to produce more hogs of the right sort in this part of the country. I think the farmers in this district should wake up and produce more pigs than they are doing at the present time. I do not think there is any branch of farming that is more profitable, as it is my experience that there is a profit of from twenty-five to thirty-five per cent. on every one of those pigs that is turned off. I do not think it is so much information that we need, it is a little more enthusiasm, and I think we should get a little more enthusiastic and do a little better in the future.

The CHAIRMAN (Mr. C. C. James): Mr. McNish has referred to a point that has often come up for discussion—the relation of the bacon industry to dairying. Most people are of the opinion that dairying and bacon production go hand in hand in these provinces, and yet that is not only wide of the mark but in many counties the very opposite is the case. The greatest dairying sections are producing the least amount of pork and bacon. The largest bacon and pork producing sections are those in which there is practically no dairying carried on. Take the counties of Essex and Kent, the greatest hog producers in Ontario, and they do very little in the way of producing butter and cheese. These two counties are our greatest corn producing counties. Why should not dairying and bacon production go hand in hand? The only explanation I can suggest is that the farmers have been making so much money out of the production of cheese that they seem to be perfectly satisfied. It seems to me that here in Eastern Ontario there is the possibility to add four or five, or perhaps ten million dollars, to the farmers' receipts through the addition of bacon and pork to the production of cheese and butter. It remains with the farmers of Eastern Ontario to show whether they are going to take that up or not. A large quantity of pork is produced in Eastern Ontario, and but a limited quantity of bacon. The packers of Montreal say that the fat hogs from the west are brought to the Montreal packing houses, and that there is in this section only a limited demand for fat hogs. There is no export trade in fat pork, but there is a limited home demand, and they have not only what is already produced in Eastern Ontario but the surplus from Essex and Kent. But they tell us they have reached the limit and that while up to the present a few pork producers in Eastern Ontario and in Essex and Kent have been getting a fair price, if the market is very materially increased over what we have at the present time prices must necessarily go down. We have, however, a home market and a foreign market for bacon, an expanding market, and if there is to

be any development it must be in the direction of bacon. We have discussed this in the Department for two years, and it has been decided to take action. The Live Stock Branch of the Ontario Department of Agriculture and the Montreal Packers will co-operate. Beginning about the middle of April this year there will be instituted throughout Eastern Ontario a series of bacon hog sales, and we hope that the dairy farmers will co-operate with us in making these sales a great success. There will first be held a series of meetings throughout Eastern Ontario. They will be extensively advertised, and at the sales to follow nothing but first class bacon hogs will be offered. You will have an opportunity of purchasing by auction first class bacon hogs of a well selected type, to be used as a basis of improving and increasing the bacon production of Eastern Ontario. The Department is going as far as it deems wise to go in the matter. There is a great field of development here, and we hope that when this discussion comes up again a year from now in connection with this Winter Fair a great deal more interest will be shown by the farmers of Eastern Ontario in this question, and that we shall have reports of very material increase in this industry. It is one of the great undeveloped industries in Eastern Ontario. You have here ideal conditions for combining cheese and pork and bacon.

CONDITIONS OF THE TRADE IN AGRICULTURAL SEEDS.

By G. H. Clark, Seed Commissioner, Ottawa.

Allow me first to say that the farmers of Eastern Ontario should be grateful to the taxpayers of the city of Ottawa for this splendid building. We should admit that the Ottawa city fathers have had a good deal of pluck to tackle a third building, after the first two had gone down with the falling sickness. The total expense has been considerable, and we may reasonably ask ourselves wherein the city expects to get a return for the money invested in these buildings. I have been associated with farmers nearly all my life— a farmer myself— and, although I am not very old, I have also had something to do with business men who know very little about farming. I have found among the latter perhaps a larger proportion of broad-minded men than we find in our best communities of farmers—men who can anticipate and estimate the benefit of such an institution as this to the farmers of the surrounding district. In erecting these buildings the people of Ottawa did not expect to get immediate return. They knew that the future of Ottawa will depend—the future of any city in Canada will depend, this being an agricultural country—very largely on the boy on the farm to-day, who will be the planner and pusher in the farm work of to-morrow. The greatest asset of this country is the lad on the farm who will be responsible for its management a few years hence. That asset may be increased or depreciated by the intelligence which the boy will be able to apply to farm work.

This Eastern Ontario Live Stock and Poultry Show is an educational institution. I have heard complaints this afternoon and evening that the show is poorly attended. I venture to say that in two or three years you will see this hall, at every session held during the show, crowded with farmers eager to get information. The people of Ottawa and of Eastern Ontario have no reason to be discouraged because of the small attendance during the first few years.

I am glad that there is a seed department in connection with the winter fair. It seems to me that the fair would not quite fill its purpose unless field agriculture were represented, and field agriculture is best represented in the exhibits in the seed department.

Yields of Farm Crops. When we consider the farm crops of Canada as a whole, and the average yield obtained, we cannot but conclude that those yields are considerably lower than they should be. Take oats, for instance, one of the main crops of Ontario and of Canada. We find in British Columbia that the average yield is 42½ bushels per acre, in the three western provinces about 35 bushels per acre, in Ontario 32½, Quebec 25, in the Provinces of Nova Scotia and New Brunswick 25¾, and in Prince Edward Island a little more. In Ontario we have large areas of oats that yield over 60 bushels to the acre; it follows that other large areas come considerably below the average. The question is, What is the cause of these low yields? The quality of the seed has, I think, much influence, but that is only one consideration. I venture to say that the main cause is found in bad methods of farming.

Weed Seeds in the Soil. The noxious weed growth is one of the most serious problems that the Canadian farmer has to contend with. During last summer we collected, in the Department with which I am connected, some twenty-nine samples of soil, mainly from Manitoba, taken from different depths, in order to ascertain the proportion of weed seeds. We found that the number ranged from 200 to 35,000 per cubic foot, sufficient to provide a luxuriant crop of their kind for fifteen years to come. How many farmers stop to consider, when they are busy with their hay or their harvest crops, that the weeds are going to seed most profusely? How many consider the supply of weed seeds they allow to go into the soil? Farmers would do better to look to this than to almost any other problem that they are tackling in field agriculture to-day.

Seed Grain: A very small proportion of that which is used in the Province of Ontario—not more than 5 per cent.—is handled by the middleman, the man engaged in the seed trade. The bulk of the seed is used on the farms where it is grown, and considerably more than 5 per cent. is exchanged amongst the farmers themselves. Under the Seed Control Act, all that is asked of the seed merchant is that in the sale of any kind of seed grain he shall provide the farmer, or other prospective purchaser, with information as to the noxious impurities in the grain. The farmer should thus be enabled to buy intelligently. If the seed vendor is offering for sale seed oats containing wild oats, or some other impurity, he is required to attach a label to the package showing that the seed contains such impurity. No parliamentary enactment can be of much help to a farmer who knowingly buys such seed for his own use.

Grass and Clover Seeds. The matter of grass and clover seeds is one of the larger problems we have in connection with the control of the seed trade. Ninety-five per cent.—I think I may say even more—of the grass and clover seeds used in Canada are either timothy, red clover or alsike. Some alfalfa is grown in Ontario and Alberta. Timothy seed is produced almost all over Canada, but the main supply of our home-grown seed comes from the Georgian Bay and the St. Lawrence Valley districts. The seed grown in those districts is as excellent as that produced in any country in the world, and perhaps that accounts for the fact that a great deal of it is exported to Europe, where it sells at fancy prices. Illinois, Minnesota, Iowa, and Wisconsin have large areas devoted to timothy seed, and that which comes to us from those districts is fairly clean, but not so 'bold'' as

the home-grown seed. When used in the Georgian Bay or St. Lawrence Valley districts it produces a crop of timothy seed as good as any produced in Canada. Not many years since farmers in Western Ontario would save timothy seed from crops of fall wheat grown after timothy sod. Such seed, screened from fall wheat, usually contain an abaundance of weed seeds, but during the last two or three years there has been little of that quality put on the market.

Red Clover and Alsike. Of the farm crops, red clover and alsike are at once the most dangerous and the most valuable to the farmer. The Province of Ontario is a large producer of the seed of these clovers. In the average of years fully one-half of the red clover, and more than that of the alsike, seed is exported. A larger quantity of red clover than is grown in Canada, but not so much alsike, is grown across the line, in the Northern States. Europe is the natural market for Canadian grown clover seeds. The greatest central distributing point for seeds of all kinds is Hamburg, in Germany. You can buy in Hamburg to-day seeds of any kind, of the very best quality, from any point of production where they are grown, or you can get the dregs of the markets.

During the last twenty-five or thirty years guarantee systems have been evolved in Europe, some of them voluntary and some enforced, under which any farmer buying seeds can get a statement of their percentage of purity and vitality. As a result of these guarantee systems, European farmers have learned that it does not pay to buy the poorer article; they are anxious to have the best, and are willing, as a matter of good economy, to pay the best price for it. As a result of that again, we find in European markets a wide variation in prices, ranging from that of the No. 1 article to that of the dregs of the market. The No. 1 can be sold in any part of Europe, but not much of the poor seed is retailed there. The cheap seed—the cleanings from the grass and clover seed that is gathered together in the markets of Europe and is of such low quality that it cannot find a retail market under those guarantee systems—is retailed in those countries where there is no system of seed control. Until the Seed Control Act of September, 1905, came into force, a considerable quantity of such cleanings from Europe came to Canada, although perhaps a larger share went to the United States. But what seemed to me to be more serious was that the best recleaned Canadian seed was exported, while the lower qualities were largely sold in our home markets. Our farmers come to better appreciate the bad results, and were at once inclined to blame the seedsman. We have, I am glad to be able to say, among our Canadian seedsmen as honest and capable men as can be found in that business in any part of the world. They handled the seed our farmers produced and sold an article our farmers demanded—the very best or the very worst, in former years principally the lower grades, because it was cheap. A great many farmers in Ontario, Quebec, New Brunswick, Nova Scotia, and, to a lesser extent, in Prince Edward Island, demanded a cheap seed, and got it, at a low price per pound, but a very high price considering the crop. With the enforcement of the Seed Control Act, our seedsmen had to face the problem of finding a market for the lower grades, a great deal of which is still produced, and of getting supplies of the higher grades. The experience of the last two years must have been encouraging to the man who has maintained a clean farm and discouraging to the one who has tried to grow clover seed on weed-infested land. Our low grade clover seeds and cleanings have now to be exported at much reduced prices. The advisability of allowing to be exported our clover seeds that are foul with seeds of the weeds we call noxious is a mooted question. What is a noxious weed in

Canada may not be noxious in another country. No weed is legislated against so much as dodder, which is not a serious pest in Canada.

The problem of disposing of the inferior seeds now produced has to be faced. The only way permanently to overcome the difficulty is by improving the quality of the seed produced. That is a slow process, but Ontario farmers should be encouraged by the advance that already has been made. We receive at the Department many complaints that the Seed Control Act is not stringent enough, and that it is not enforced to the letter. If the men who send in those complaints would travel through Central and Western Ontario in October or November and see for themselves the quality of the seed as it comes from the clover mills in operation in farmers' barns, they would have a better appreciation of the difficulty the seed merchant has in supplying the demand for seed of first quality. The red clover crop of this year is almost a failure. I do not know, however, of any crop that pays better, taking the average of years, than red clover seed.

Imported Red Clover Seed. On account of the failure of our home-grown crop last year more than half of this year's red clover seed will have to be imported. It will come largely from Chili and Great Britain, and some from France. We have heard alarming statements during the last month about new species of weeds detected in imported clover seed. I have examined four lines of samples of red clover seed offered to our merchants by English wholesale firms, by whom it was imported from Chili. A large quantity of imported seed has also been examined in the seed laboratory, and that imported as No. 1 was really a good, high-class, clean seed. From the red clover seed now offered from abroad, our merchants have the privilege of purchasing the best or of taking, at a lower price, decidedly inferior seed. We have a great many jobbers engaged in the seed trade—merchants who do a wholesale business, but whose main business is of an entirely different character from that of seeds, and who have imported perhaps more than half of the red clover seed that has been brought in from abroad. Much of that is of a quality that will only pass the minimum standard of the Seed Control Act.

Nature of Impurities in Imported Clover Seed. The principle impurity which has alarmed seedsmen is dodder. In a country where it will thrive, it would ruin the clover crop to sow seed containing dodder. The dodder winds itself around the clover plant and feeds on it as a parasite, and will spread very rapidly and widely. But weeds noxious in other countries may not be noxious in Canada. We have been testing seed here for the last five years, and I have discussed the matter thoroughly with other botanists who have been in touch with the clover seed trade for fifteen or twenty years, and I have yet to find the man who ever saw a kernel of dodder seed in Canadian grown red clover. The species coming to Canada is a native of a warmer climate, and does not seem to thrive here. If you know what it is you need not have any serious fear of permanent injury coming from clover dodder. Many farmers will remember that about thirteen years ago buckhorn or ribgrass was introduced in the same way. Unfortunately our Canadian climate was well suited to that pest, and it has caused untold loss.

Root Crop and Garden Seeds. I will refer for a short time only to the root crop and garden vegetable seeds. All our root crop and a great many of our garden vegetable seeds are imported, some of them from England, some from France, and such as the sugar beet seed from Germany. In getting their supplies our importers have the option of buying good, selected seed from reliable European growers or of getting cheap seed from unreliable

growers. Anyone who has travelled over Ontario and the other provinces as much as I have during the last four or five years, and has made careful observations of the quality of the root crops will have seen that the quality of the crops varies widely with the quality of seeds obtained from different seed houses. In getting their supplies of root crop seeds farmers have to depend on the reputation of the man from whom they buy. If you send a sample to us we can advise, after making an extensive growing test, only as to its vitality. Although varying conditions of soil and climate have to be considered, as a rule when a carrot crop contains a large proportion of plants that go to seed the first year, you can safely conclude that the seed was grown from a poor and unselected stock. In turnips, marked unevenness in type, too much fibrous roots or thick necks, denote that the seed has come from poor stock and has not had proper selection and care at the hands of a reliable seed grower. There are many responsible growers in Europe, and their reputation is the only protection that our seedsmen have to fall back on. Competition in these seeds is restricted far too much to the matter of prices; our root crops, in consequence, are not so satisfactory as they might be. From testing at the seed laboratory several hundred samples of garden seeds each year, I am often surprised at the quality, in respect to vitality, of the seeds put on the market by some firms. The farmer or gardener should get from his seedsman a statement showing the percentage of vitality of his root crop and garden seeds. Seedsmen who deal in large quantities of onion or parsnip seed and who have a lot left over at the end of the season are not likely to destroy them. Such seeds, unless they are fresh, are practically useless except to increase the bulk. Farmers and gardeners should know the proportion of the seed that will grow. Those who buy and use seed without knowing its percentage of vitality take a good deal of risk.

The CHAIRMAN said that he did not know when he had listened to an address which had broken into so much new ground as had that which Mr. Clark had given. He was glad to see this subject added to the winter fair programme, and hoped that it would increase under Mr. Clark's efforts. Seed control is one of the basic things in agriculture. The question had come up several times in the Ontario Legislature, and it had been pointed out, as Mr. Clark had said, that the only thing people can do is to rely on the reputation of the man from whom they buy seed. It always came back to that one point, that they could not make the seed merchant directly responsible. He had wondered whether, in the case of the importation of seeds, it would be fair to limit that. Now, Mr. Clark had told them that reliable merchants are importing pure seeds, but that others are bringing the dregs of the markets, the question was, whether they would be warranted in controlling the men who import seeds.

Mr. CLARK said that the wholesale merchants of Canada have spent a good deal on their cleaning plants. There are cleaning stations at Toronto, Hamilton, London, Montreal, Oakwood, Quebec, and other points. The merchants want the privilege of importing for recleaning seeds of questionable quality. They have always had that privilege. He thought that for the next few years the safest way to control that seed is when it is offered in the retail market. There are many objectionable features, both from the business man's and from the farmer's point of view, in the restriction of seed importation. The sale of low grade seed should be prevented, but until the supply of home-grown seed had improved he did not think it would be beneficial to restrict the importation of seed.

The CHAIRMAN remarked that he was not sure they would meet with great success in enforcing this Act. Perhaps the trouble is that the Cana-

dians are a very independent people. They seriously object to interference; they will oppose any attempt to enforce an act which seems to interfere with trade. One had only to go to Europe to see a wonderfully different state of affairs. There the people have been accustomed to submit to Government regulation which in Canada would be regarded as interference. The commission appointed last year to investigate the horse industry was an example. People thought that information was being gathered to serve as the basis for regulations for the restriction of the service of stallions, which would put some people out of business. Of course, no such instructions were given. However, the day will come when they will have to submit to the rule of the majority, and he wondered if Mr. Clark thought they were sufficiently advanced to limit the importation of seeds to certain persons.

GLEANINGS FROM FIELD WORK IN ONTARIO DURING THE PAST SUMMER.

By T. G. Raynor, Seed Branch, Department of Agriculture, Ottawa.

I am sure it is a privilege as well as a pleasure to be present on this occasion to talk to you on what I consider to be a very important matter. Our worthy chief referring to me said that part of my business as an inspector was to see that the farmers got good pure seed. Now I want to say just a word on this point and it is this, that there has been an educational process going forward in this country along this line and there is an increasing class of farmers in this country who are asking for a number one grade of seed. I found last spring that those dealers who had dealt in these first grade seeds were sold out of them first. Now the question that I am to introduce to-night is along the line of the work in connection with our seed branch.

The Seed Branch stands for three or four things. It stands for the production of high class seeds, the eradication of noxious weeds and the best methods of tilling the land so that we can get the best result when we get the good pure seed. In the report of the Bureau of Industries the Chairman tells us there are about five million acres devoted to field crops such as barley, oats, peas and the cereals excepting corn. Approximately we have between nine and ten millions of acres under the plow in this good old Province of Ontario and we are producing a very large amount of grain from year to year. Our stockmen are certainly interested in this question. There is no farmer in the province who should not be interested in the production of high class seed. I find in my experience as a farmer that high grade seed is good seed and cheap at any price and low grade seed is poor seed and dear at any price. Now we want to grow a high class quality of seed and we want to know that we can expect the maximum results from that seed. Take a kernel of corn for instance and you may know that hidden in that seed is a little plant that is going to start a new life out of the forces stored up in it. We call that the germ.

By the means of diagrams Mr. Raynor here explained the scheme of Dr. Robertson, Principal of the Macdonald Agricultural College, for improving seed. The method of selection practiced by the Members of the Canadian Seed Growers' Association is to start from the original crop by selecting a sufficient number of the best plants which when thrashed will sow a breeding plot of at least a quarter of an acre. This seed should be given a clean, fine seed bed, the following year, and when ripe, just before

harvest, a sufficient number of the best plants should be selected to sow the breeding plot of the following year. This is done for three years when the result of the breeding plot will produce seed that will register. A member of the Association could gain two years by buying registered general crop seed of some member who had been doing this work for five years.

Proceeding Mr. Raynor said: All things being equal a seed which is large and plump and has stored up a large food supply, will have a good chance to start in life and that is why we stand up for good seed. There is scarcely a farmer we find in the province but who believes that any variety of crop he is growing will run out, and he says, "I must change my seed" in order to keep up the yield per acre. Then he reads up the seed catalogue and he finds a high priced grain and because it is high priced he thinks it is a panacea for all the farmers ills. So he buys some of that seed, or perhaps he has been to his neighbors and he has learned that a certain variety of seed is yielding better than his own. He makes an arrangement that he shall have a certain amount of that seed. Sometimes he brings it from a heavy soil to his light soil, or from a light soil to a heavy soil, thinking the change of soils has something to do with it. I do not think that as much credit should be given to that system as is given to it for I find out that if I go to my neighbor to get seed grain I never think of giving that seed the worst place on the farm. If there is a good place it will be there that I will put that seed. So I suit the environment, I give the very best soil condition and I get all the forces of nature to help to produce a good crop in the importation or the bringing in of that variety and when I compare that with other varieties produced on my farm I naturally say it has come from the exchange of seed, while it has largely been a case of environment and the better condition of the soil. Now another thing I wish to take up in seed selection is the use of the fanning mill. I am in favor of the fanning mill. I fear it is not going to be used as much as in the past, but what we want to do is to see that it shall be used a good deal more. My contention is that all our seed grain should pass through the fanning mill frequently enough to fan out all the light stuff and screen out all the small seeds. That will require it to be put through the mill perhaps three times and when we have got four bushels reduced to three bushels as it comes from the bin we can say the fanning mill has done its duty in bringing out the best seeds. The fanning mill can never distinguish between the large plump seeds which come from large heads and the large plump seeds which come from small heads. You know very well the laws that were in operation in improving the stock in connection with this cattle exhibit the very same laws that have been in operation for grading up our herds and flocks may be applied to improving our seed grain. If large plump seeds come from a large plump head the fanning mill cannot distinguish between them and those which come from small heads. We think we have a little better system than that. There are some men willing to stand up and say they are not afraid to sow small plump seed, and that the result has been satisfactory. This may be true occasionally. I believe, Mr. Chairman, that a great deal of money could be made on Ontario farms by a better fanning mill system of selection than is adopted at the present time. If we can increase the yield per acre five bushels by an improved fanning mill system of selection I believe we can increase it another five by the system of selection I am going to introduce to you.

As to the organization of the Canadian Seed Growers' Association. How many farmers are there who practice this plan, that when they are cutting their grain they will save by itself for seeding purposes that which has

grown on the highest ground and has fully matured at the time of cutting. There are a few farmers that do that. The majority of the farmers will go direct to bin and take seed which has not thoroughly matured. We find a certain number of men who do not appreciate the treating of their seed with solutions that kill the smut. I do not believe that farmers are waking up to the importance of this matter as they should.

The selection of the seed from a breeding plot is similar to the selection of the pure bred sire, in producing good stock, and the breeding plot in grain is calculated to take the place of the pure bred sire. Supposing you appreciate the system like that adopted by the Association referred to you can save two years in the operation of getting the seed registered by buying from some man who has been doing this work for five years and who has produced registered seed. Are these points worthy of consideration? I am sure the Association is doing good work and the lessons the people of Ontario are learning is telling.

Replying to a question from the Chairman the lecturer said,—The man who is improving his stock tries to get the ideal animal photographed in his mind. In the improvement of our grain, I think we should have an ideal grain in mind as far as we can get it and improve to that ideal, and of course we can only do that by selecting seed from the best plants.

Q.—Have you done anything in the way of vegetable seeds?

Mr. Raynor: Only in the way of potatoes and tomatoes. Mr. Robertson of St. Catharines, Ontario has been experimenting in regard to tomatoes and he is getting an earlier tomato and one of better color and size than the original and that was what he was aiming at.

Q.—It takes three years to produce seed which will register?

A.—Yes.

Q.—Well, is it not better for us to get the registered seed?

A.—Yes, it certainly is. You get two years advantage.

Q.—I do not ask that for my information but so that the gentlemen should know it.

A.—It is a good point. Here a man may have a good variety of wheat, or oats, or barley and he knows what it is producing on his soil.

Mr. Raynor here exhibited a specimen of Reid's Improved Dent Corn grown in Essex. It was a very creditable ear to grow anywhere, and he said it was the result of selection.

The seed exhibited at this show I do not think is as large or as creditable as it should be for Eastern Ontario. The keenest competition was in oats, but in other lines there was not as great a competition, but I want to congratulate those who did exhibit on the quality of their exhibits for they cleaned it up well. One of the main things in reference to the breeding crop system is that we are able to choose our mother ears from the most productive ears.

The Chairman: We have not the history of each individual ear.

Mr. Newman: Only for the last two years. It is possible that each different ear comes from a different father. That would represent a different capacity in the yields. We know that there is a great variation in the yield.

Q.—Do most of the farmers try to grow ensilage corn?

Mr. Newman: Yes, they try to get large corn and which is perhaps full of water. I think people have made a mistake in regard to ensilage corn. I think if you get more solid food in the way of more dry matter and more grain you will get something that is going to give more milk per cow than the other.

What we are trying to do along the Lake Erie Counties is we are trying to get an ear which will yield more shelled corn. At the present time seedsmen are getting their seed from the United States.

Q.—What kind of land do you find best adapted for corn?

Mr. Newman: Well, you expect a light soil. Corn is a heat loving plant and you have got to take in as much heat as quickly as possible and shove it along.

THE FARMER'S FLOCK OF SHEEP.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

As I understand it, the object in placing this subject on the program is not to urge every man to keep sheep, but rather to present to the public some of the claims of the sheep to popularity, in the hope that it may bring about a discussion which may be beneficial. I do not think it would be wise for every man to keep sheep, for the reason that in order to be successful with any class of animals, a man must have a love for them, and if a man does not like sheep, he would not be likely to make a success of them. There are several things about the sheep, however, which make them especially well adapted to occupy a place on almost any farm, and I shall attempt to place these points before you as briefly as possible.

(1) Sheep will eat a great many kinds of weeds which other animals will not touch. This makes them especially valuable about a farm as a sort of scavenger.

(2) They will live on very poor pastures where many other animals would starve. Their activity enables them to travel long distances in search of their food, and the formation of their mouth is such that they can bite very closely to the ground, enabling them to gather a living from the poorest soils.

(3) Sheep require very inexpensive buildings. Almost any sort of building will answer the purpose so long as it protects them from storms in the roughest weather, and is reasonably dry and free from draughts. There is no farm animal for which cheaper buildings are required.

(4) There is comparatively little labor involved in taking care of a flock of sheep. I do not know of any animal that requires less labor in its feeding and management.

(5) They grind their own grain, which is another factor which adds to the cheapness of their maintenance. They are the best grain grinders which we have, and the weed seeds consumed by sheep are never known to grow afterwards. This is not true of other farm animals.

(6) They are economical producers of meat. There has been a good deal of experimental work in connection with this matter, and it is generally estimated that to produce a pound of increase in weight a sheep requires from 8 to 9 pounds of dry matter in its food, whereas a steer requires some 12 to 14 pounds of dry matter. This shows that the sheep is a very much more economical producer of meat than the steer, and it also compares favorably with the pig, especially during its early period of growth.

(7) The sheep gives two products in a year, namely, wool and lambs, both of which have a ready market.

(8) While it is true that sheep are more liable to sudden death than some other farm animals, at the same time, the amount of capital invested in a sheep is small and losses of this kind are not serious losses after all.

But while the sheep has so many things to commend it, I do not think it would be wise for the average farmer to stock his farm heavily with sheep, neither do I think it wise for him to go to the other extreme and dispense with sheep altogether. The sheep is eminently well adapted to fill in a peculiar place on the farm, making an economical use of products which would otherwise be wasted, and constituting what might be called an important side issue in the business of farming. The cost of maintaining a small flock of sheep is comparatively trifling and the returns they make add materially to the revenue of the farm.

The trouble with many of us is that if we cannot go into something on a large scale, we do not wish to touch it at all, and I believe that in many cases if we had fewer sheep, fewer hens, and fewer hogs and had them looked after better, it would be to our advantage. There is no reason why the sheep should not be increasing the revenue from many of the farms of this Province where at present no sheep are to be found and we believe that the farmer will find the sheep one of his best friends if reasonable intelligence is used in its management.

Q.—What kind of fence would you recommend?

A.—A woven fence.

A Member: I was driven out of the sheep business by dogs.

Another Member: I believe that in the eastern part of the Province we are infested with a weed that would not exist if we kept more sheep, that is the sow thistle.

Q.—What breed of sheep would you recommend for the average farmer?

A.—In this room there are men who are breeding Shropshires, Southdowns, Lincolns, Dorset Horns, and probably a number of other breeds, and each man feels sure that he has a good breed for his purpose. It is impossible, therefore, to recommend especially any one breed of sheep, because all our improved breeds will give good satisfaction if properly handled. Each man has his likes and dislikes in the matter of sheep as in everything else, and possibly one man may find a certain breed will do better under his conditions than another breed, but it is simply impossible to make general recommendations as to what breed should be taken up.

Mr. John Jackson: I was just going to make one remark in regard to the care of sheep. In a good suitable building, I would rather take care of one hundred sheep than one dairy cow.

Q.—Have you had any experience in regard to different kinds of soil for sheep?

A.—No, I cannot say that we have, although, of course, we like to keep the sheep on the highest and driest land which we have.

A Member: In some parts of the country where the land is sandy, farmers had to quit raising sheep because they could not keep a ewe more than three or four years. Their experience was that the sheep ate too much sand when they were eating the grass.

THE PRESENT CONDITION OF THE SHEEP INDUSTRY AND PROSPECTS FOR THE FUTURE.

By Robert Miller, Stouffville.

I believe this is the third or fourth time I have spoken on a subject of this kind at your winter fair. I dare say different people may wonder that I should get these repeated invitations to come down here because it seems to me a simple matter to talk on the subject of sheep breeding. It always seems something commonplace when I enter into it and I do enter into it every day of my life even when I do not stand before an audience and address them. But there are a great many phases of this question. You notice from the speeches how many branches that sheep are connected with on the farm. One man says they take up the weeds and the seeds that fall from the weeds never grow any more. Another man tells you he has got to get particular fencing. Another man tells you about the dogs, whilst another man tells about the sand. Gentlemen, we will find little difficulties like this cropping up no matter what business we embark in. But I can tell you if it were not a fact that there are less disadvantages and more advantages in the breeding and growing of sheep I would not be connected with it. I have had experience in horse breeding. I was brought up on a farm where there was a large amount of cattle breeding. If I wished to select the cattle breeding and importing for my chief industry I could do it. But I can tell you that in the face of all the advantages that do exist in connection with the importing of good cattle and good horses, I have selected as my choice and my chief business the importing of sheep and distributing them through Canada and the United States, and this notwithstanding all the difficulties we encounter. It is no use for any man to profess to be interested in sheep breeding if he is not ready to keep his sheep in his fields. We must not be too ready to blame our neighbors for the difficulties on our farm. I can tell the gentleman who spoke of wire fences (barbed wire fences) that they are considered a back number in my own part of the country. In all parts of America they are using woven wire instead of the barbed wire. I believe that that should not be considered as an outstanding difficulty to be met with if we are to go into the industry of rearing sheep. Another difficulty is the dog nuisance. I believe that sheep are of more importance to the people of this country than dogs are (hear hear). I like dogs as well as anybody else, but I do not claim for them any privilege on my neighbour's farm. If we had as strict laws in regard to our dogs as we have in regard to our sheep, we would have the the same privilege as the dog men. Now the question arises as to whether it would be profitable for all men to keep sheep or not. I do not believe it would. I believe in the case of a man who dislikes them, it would not be a wise thing for him to invest in sheep because I do not believe he would do well with them. If a man dislikes them they never will do well. There has to be a sympathy for the sheep. There are a great many farms in this country and more especially in this part of the province where it would not be well to stock your farms heavily with sheep. I believe, however, a few sheep would do well on any farm. Some farms will take a large number of sheep and some will do otherwise. I was born and raised in the township of Pickering. We could not keep a very large number of sheep on our land for the reason that there was a stiff clay sub-soil. Another neighbour kept a large number. That shows that the land must be well adapted for his sheep and that is an important thing. We can scarcely speak of the sheep industry with attaching to it a certain amount of discussion in regard to the sheep

industry of the United States. In the United States perhaps twenty-five per cent. of the men who claim to be lovers of sheep go out of the business every year, and they do it because their flocks have become unthrifty. Their flocks have become unthrifty because they do not take care of them. We find year after year men coming over for from fifty to one hundred and two hundred to five hundred and I can tell you that I have sold 2,000 rams to two men in three days. These rams have to be supplied, and these men knowing the good character of the sheep sold here will come from the States to this country and will pay us well rather than buy them in the States. This shows we have splendid chances in regard to sheep breeding. We go to Mexico. We know the people of Mexico would rather deal with us than with the people of the States because of the war that took place between Spain and the United States. Some of the best customers we have in this country live in that great Republic of Mexico. There is perhaps a greater opening there than in any other part of the world. That shows you what great advantage it is to keep a good clean bill of health in this country and try and supply unlimited numbers because there would be unlimited numbers as far as our resources are concerned. It is not a month ago that I refused two orders for yearling rams simply because we could not get them here in Canada.

Mutton is a more healthful food than beef is. There is just something in connection with this that everybody ought to learn, mutton or lamb in this country has never had the chance it should have in being compared with other kinds of food. There are very few people who know how to dress a lamb. No meat ought to be eaten until it has been thoroughly matured on the hooks, but it is most important that mutton should be matured before it is eaten. Now, Gentlemen, I am afraid I have touched very lightly on my subject proper—the present condition of the sheep industry in this country. There are very few of the improved or pure breeders that have any sheep for sale. You will know that is a fact when I say I refused not long ago orders because I could not get the animals. I have sold twenty-five thousand dollars worth of sheep to one man the past year.

The CHAIRMAN: Where did these sheep go?

Mr. MILLER: They all went to the States and they were distributed all over by him. I do not know that I have ever had greater faith in the sheep industry than I have to-day. Mutton and lamb have apparently obtained a sterling value in the States such as they have had for a very long time in Great Britain. I have many a time seen when people in England did not know whether their beef cattle would pay them or not, but I cannot remember a time when they did not know that their yearlings and lambs were going to pay them. Now gentlemen, I just thought a little illustration or two with regard to every man keeping sheep with advantage might be interesting. Speaking of horse breeders, I think perhaps no man on the face of the earth to-day has been more successful as a horse breeder than Andrew Montgomery. He breeds quite a number of sheep every year. He told me the sheep that he raises pay him as well as the horses that he breeds. I could give a great many illustrations. W. S. Marr told me that the sheep he breeds paid him as well as his Shorthorns. Here were men that believe in mixed farming, and they would not be induced to leave out the particular branch (the sheep) which I believe the most successful branch of mixed farming. There is just one little point concerning what Professor Day told you. He said sheep needed less care than other animals. Now I believe there may be a wrong meaning take out of that. I believe sheep do not require as much care as other animals, but they do require some care. I do not think it would be right and it is a mistake to put a few sheep in a field and put a fence around

them and then think you have made provision for them for six months. That is altogether a mistake. I do not believe that is the proper way. You want to think of your sheep and if you can give them a little change of food I can tell you they will pay you well for your attention.

Replying to a question, Mr. Miller said: I think if a man keeps a large number of sheep it would not be well to let them run with cattle. If you have a small flock of sheep it will not do your cattle any harm. As to the question of breeds. If a man likes Shropshires, or any other breed let him keep them.

Q.—Would you cross a Leicester ram with a Shropshire ewe?

A.—I think if a man is going to breed sheep for feeding purposes it is a very good thing for him to cross. I would, however, rather cross them the other way. I would rather cross the Leicester ewes with a Shropshire ram.

A Member: In regard to the dog question, my idea would be to compel the people to tie up their dogs and let it be understood that that dog must abide by the law.

Another Member: I think it will be a good thing when the law is reconstructed so that there is a heavy penalty for dogs being allowed to run loose in this way.

Mr. Miller: I take the view that every man should be forced to look after his dogs.

A Member: I think a dog is more protected than the sheep in some parts of the country. I knew the case of a man whose dog had done damage to his neighbour's flock. He went to the owner and said what is the amount of the damage? He replied so many dollars and so many cents and was paid. Then he said now I have paid you for your sheep I want pay for my dog which you killed.

The Chairman: A few years ago, I knew a man and I never saw one so enthusiastic about sheep breeding as he was. He said "You have got an ideal country for the breeding of sheep; you have got good grass, good clear air, and good clear water, and whenever you have these combinations you have the ideal conditions for growing not only good horses and good cattle, but good sheep." Now as to the question of future prices. Mr. Miller did not venture on any prophesy in regard to that. I think we are just entering upon an era of good prices. The prospect is that high prices will continue for sheep and the farmer is the one who will benefit by this.

JUDGING MUTTON SHEEP.

By John Jackson, Abingdon.

To illustrate his points the lecturer had before the audience one of the prize sheep taken from the show and which he considered a good all round specimen. He said: "I am in a way pleased that so much has been said about sheep for there will be less for me to say as to the judging of sheep. There are a number of difficulties in the way in this matter. One difficulty is the covering with wool, and therefore, you have got to have experience how to handle them and understand whether they've been manipulated with the shears, to find out whether the sheep is as straight and level as he looks, or not. The shepherds have their "fine art" down fine, cutting down the high places, this will deceive the eye, but not the hand of the experienced judge.

We know we have very much better judges of sheep now than we had a few years ago, I remember when a good judge of sheep was a very rare thing; in fact, they are not too common to-day.

To come to the point of judging sheep, the subject before us. I think it a good idea if you have a good row of sheep to judge to first walk around them, viewing them from in front and behind, see that they stand well on their legs and pasterns, then go over them selecting out the best by themselves till you have one or two more than you have prizes for, look for the poorest in this lot, then go over them once more to see if you have left one as good or better behind, then confine your work to a thorough examination of this lot. It is better to do this in a systematic way, say beginning at the head." Mr. Jackson then took the sheep before him and explained the various points. He said it was necessary to have a clean cut head, wide between the eyes, open nostrils, ears and covering according to the breed represented. If a ram he should by all means show a strong masculine character, neck strong, tapering from head to shoulders where it should join smoothly. The neck veins should be strong, shoulders should be well packed up, not loose and open as if stuck on outside the body, should be wide in the breast, deep and wide through the heart girth, back broad and level well covered with firm flesh or muscle, well sprung deep ribs, broad strong loin, well let down at flanks. The body as viewed from behind should be broad and deep like this sheep that we have before us.

The leg of mutton and the back are the most valuable parts in a sheep. Quality rather than size should be the aim of every producer of mutton sheep, no matter what breed, for that brings the highest price in the market. Ewes should show a little more of the dairy type, they will nurse their lambs better.

It requires a good deal of close attention and practical experience to become an expert judge of sheep, and every man to be a successful breeder of sheep must be something of a judge or he is liable to make serious mistakes. Proceeding, Mr. Jackson said one reason why we have better judges now than in days gone by, is the fact that we have better and more well bred sheep, more different breeds in country. Most every one has got in the way of breeding a better class of sheep.

Then there are those judging classes held through the country, and last but not least I think the short course judging classes at the O.A.C., Guelph have done very much in improving the judges of the country. It will well repay one who intends breeding sheep or any other class of stock to attend at least one of these short course classes. They take place at a time when most convenient for farmers to spare the time to attend.

METHODS OF RAISING STEERS.

By G. E. Day, Professor of Agriculture, O.A.C., Guelph.

Whether it is advisable for the people of this section to attempt raising steers for beef is a matter which they must settle for themselves. I know that the farmers here have been urged to use beef blood in their herds with the object of improving the beef qualities of their dairy herds. I certainly do not intend to advocate this system, as I am doubtful regarding the advisability of mixing beef and dairy blood. It is true that cross breeding is carried on successfully in some places, notably in Great Britain, but the work is carried on with a definite object in view and the crosses are made

judiciously. In this country, I believe that the indiscriminate mixing of breeds has worked a great deal of injury to our live stock. It is my opinion that it is safer for the average farmer to stick to one breed, getting the best possible representatives of that particular breed and gradually bringing it towards perfection, whether it be for beef or for milk production. Indiscriminate cross-breeding has never been known to result in improvement.

Cheese-making, of course is very unfavorable to beef making. The two things do not harmonize, first, on account of the class of cattle used in the production of milk for cheese-making, and secondly, because the milk is sent to the cheese factory and there is very little available for calf feeding. It is almost impossible to raise steers successfully without using considerable milk. In other sections we sometimes find the opposite extreme, where cows are allowed to raise their own calves and possibly only one calf to a cow. This method is too expensive for raising steers and is practicable only where pure-bred calves of the beef breeds are being raised for breeding purposes, or steers for show purposes. There are some very successful farmers however, who make one cow raise two calves, and in some cases three calves during one period of lactation, and the remainder of the cows are milked by hand. This method has many things to recommend it where conditions are favorable, and where calves of about the same age can be procured. A smaller amount of milk will satisfy a calf when it draws it for itself, and by allowing the calves to do their own milking, considerable labor is saved, both in regard to milking and calf feeding.

By far the greater number of calves which are raised for market purposes are fed upon skim-milk, and it is possible to raise calves very successfully under this method. I am acquainted with one very successful breeder of dairy cattle who raises his calves without the use of skim-milk. The milk is sent to the cheese factory and consequently no skim-milk is available. His practice is to feed the calves on whole milk for the first five weeks of their lives. Then he begins to cut down a little on the milk and introduces a gruel made from oil cake. The milk is reduced very gradually and the oil cake gruel gradually increased. At first the calves will receive only about a tablespoonful of oil cake, and this quantity is increased until eventually the calves are taking at least half a pound of oil cake a day. It requires somewhere about five weeks from the time he starts to reduce the milk until it is withdrawn altogether, and during this period the calves are taught to eat so that by the time they are ten weeks old they are getting no milk whatever. Of course, these are calves of dairy breeds, and I do not think the method would be the most suitable one for steer raising, but it would certainly be a great deal better method than many methods employed at the present time in raising steers. Were it not for the labor involved, I think this method could be improved by gradually introducing hay extract, or hay tea, in the place of milk. Hay tea has been used in calf feeding for a great many years, and while it is not a perfect substitute for milk, at the same time it is considerably better than water, and I think it should work in well with the method which has just been described.

Where skim-milk is available, the difficulties do not altogether disappear by any means, and many calves are ruined by changing from whole milk to skim-milk suddenly, and in addition feeding them too much skim-milk. In feeding any class of stock, all changes should be made gradually. If it is necessary to make a change at all, some time should be occupied in bringing it about, otherwise there is danger of injurious results to the digestive organs. The more gradually changes are brought about, the more successful will be the feeder. For calves that are intended for beef I think that

three weeks feeding with whole milk is not too much, and at least two weeks more should be occupied in changing gradually from the whole milk to skim-milk. Care must also be exercised not to over-feed with skim-milk, and I believe this is one of the commonest mistakes in skim-milk feeding. Ten pounds of whole milk a day is plenty for a calf up to the time it is three or four weeks old. By the time the change has been completed from whole milk to skim-milk, fifteen pounds of skim-milk per day is plenty and there are some very successful feeders who claim that at no time in a calf's life should it receive more than twenty-four pounds of skim-milk in a day. There are many calves permanently injured by over feeding with skim-milk, which tends to cause indigestion, and it is safer to slightly under-feed than to over-feed with skim-milk.

As to foods to be given with skim-milk, a great many things are recommended by different feeders, and there is little doubt that the feeder has a wide choice in the matter. Some feeders use oats, others use oil cake, others again use corn, or a mixture of oats and corn. Some use flaxseed, and in many respects flaxseed is preferable to oil cake for feeding with skim-milk, if it is used with care. Flax seed is richer in fat than oil cake, and if steeped in water so as to make a jelly it answers very well for the purpose of supplementing skim-milk. The flax seed jelly answers especially well for very young calves before they have commenced to eat well. When they can be got to eat grain, such as oats, or oats and corn, with perhaps a little bran and a very little oil cake, the need for the flax seed jelly practically disappears. I would prefer a mixture of oats, corn and bran to any one of these foods fed singly, though oats are certainly a very safe food for almost any class of stock. By the use of a little patience, a calf may be taught to eat at a very early age, and the sooner it can be taught to eat, the better.

I have attempted to point out some of the mistakes that are made in feeding calves, but there are many men who get along very well with their calves who make a fatal mistake later on. After the calves are weaned, and especially during the winter months after weaning, the farmer sometimes gets an idea that it does not pay to feed these calves well. They are therefore fed very little but straw, and possibly some silage or a few roots, and the result is they make little or no growth during the winter, and come out in the spring extremely thin. I have here some very instructive figures relating to results obtained at the Central Experimental Farm in experiments made by Mr. Grisdale. He found that skim-milk calves under eight months old, produced 100 pounds increase of weight at a cost of about $3.40. Yearlings cost about $4.30 for 100 pounds gain, and two years olds cost $5.99 per 100 pounds gain, which is an increase in the cost of 100 pounds of gain of $2.69 over the calves, and $1.69 over the yearlings. He also found that for a three-year old it costs $6.52 for 100 pounds gain in weight. In addition to these figures, I would like to give you a few more, representing the results of experiments at various American experiment stations, as well as from the Fat Stock Show at Chicago. These figures show that with steers from one to twelve months old, the cost of producing 100 pounds of gain ran from $1.87 up to $4.20: from 12 to 24 months old, it ran from $6.30 to $8.12, and from 24 to 36 months old it ran from $9.59 to $12.54. It will be seen, therefore, that the cost of producing 100 pounds of grain increases very rapidly as the steer grows older, and that the most economical use of food is made by the young animal. The farmer, therefore who starves these calves and yearlings, thinking it poor economy to feed them liberally at this early age, is making a very serious mistake. He is refusing to use a valuable machine just at that time when it can do the most effective work, and after he has checked

its growth by poor feeding for two or three years, he then attempts to fatten the animal for market. The result is he has lost his opportunity to make money out of this animal, because he has failed to take advantage of the cheap gains it was capable of making when young, and he starts in to obtain his gains at a period in the life of the animal when it is not in a position to make the most economical use of food. I believe it can be demonstrated that to get the most profit out of a steer which we raise ourselves, he should be ready for market by the time he is two years old. In fact, in raising these steers they should be kept in such a condition that they are practically ready for the butcher at almost any time. The farmer need not be afraid of feeding these animals liberally because these young things are in the very best condition for using the food to good advantage. The farmer will also find that the market is always hungry for this class of animals, and he will have no difficulty in selling his product at a premium above the market price.

Q.—Do you recommend letting the calves run outside during the summer?

A.—We generally find that we get the best results if the calves are kept in a large airy shed where there is plenty of ventilation and room for exercise. If there is plenty of shade, a small pasture will answer very well.

Q.—Where they are kept inside, would you recommend letting them out at night?

A.—There can be no objection to letting them out at night in warm weather, and in fact the open air exercise will do them good.

Q.—What about feeding warm milk?

A.—I believe milk is better always to be fed warm.

Q.—At what age do you advise turning calves to grass?

A.—We do not turn them out until the second summer.

If the calves have a good airy pen in which to run, we generally find they do better than those which run in the pasture field with the cows. I do not think it is a good plan to shut calves up in small pens, I think it would be much better to let them run in the field than do this, but where suitable and roomy quarters are given them inside, I believe it is better to keep them in, especially during the very hot weather when flies are bad.

IS IT POSSIBLE TO BUILD UP AND MAINTAIN A HERD OF DUAL PURPOSE COWS?

By J. G. Clark, Ottawa.

In dealing with this subject I feel that I have something rather difficult to handle. It is a subject that has been discussed a great deal, and a great deal of difference of opinion seems to be manifested. Is it possible to build up and maintain a herd of dual purpose cows? I believe it is. But I believe also that the man who undertakes to build up and maintain a herd of dual purpose cows has to be satisfied with a smaller percentage of profit, and with smaller wages, than the man who breeds and maintains special purpose cows. The difficulty, and I think it is met with by all breeders, is that if we try to get beef and milk combined you cannot possibly get the best of either. You have got to be satisfied with a poorer quality of beef and with less milk. There are conditions in certain countries in which perhaps it is necessary for a man to try to get on his farm a herd of dual purpose cows. Perhaps he finds it difficult to get milkers and perhaps he has not a

very good way of marketing his dairy produce. In that case it might be better for him to get dual purpose cows. If he does I think it is of the greatest importance for the sake of his own profit that he keep in mind always the production of beef rather than the production of milk. It is a difficult matter to get dairy cows handled properly and when a man undertakes to keep dairy cows, to go in for dairying as a special line and work it, it becomes necessary for him to get the very best cows he can get hold of. He is not doing that if he tries to get beef along with the milk. The difficulty, as I have said before, in the dual purpose herds is the difficulty of getting the profitable dairy cow combined with the profitable beef cow. Those of you who are acquainted with the matter know that up to the year 1887 we kept Shorthorns and Shorthorn grades, and I think I am safe in saying that we had as good strains of milkers as any Shorthorns I know of to-day; and yet in spite of the fact that we took all the pains possible to get the sires from the best dairy Shorthorns in every group of heifers there were several unprofitable milkers, and it just resolved itself into a matter of one half of the herd feeding the other half and leaving nothing for the owner. When a man is breeding for beef, I believe it is necessary that the milk production should be developed as far as he can but always keeping in mind the best production of beef rather than anything we can get out of the milk. It is necessary that the beef cattle should produce sufficient milk to assist in paying the expenses of the farm because as the figures very clearly show a man who depends on the production of the beef steer to pay his expenses and does not get anything out of the dam has a very narrow margin if he has any margin at all. Therefore it is necessary that we should develop the milking qualities of our cows even when we are in the production of beef. But I am firmly of opinion that the man who is in a locality where he can market his dairy produce to any advantage is much better to devote his time to building up a dairy herd and to leave the beef production out of the question altogether. This is a serious matter for many farmers and farmers require to compare notes. Let them take up the figures of men in a community that are breeding for milk, with those men breeding for beef and I think they will find that the man who is breeding for the best in the dairy market will compare favorably and will show a greater degree of profit than the man who is trying to get both. Just for the sake of argument let us concede that it is possible to make a profit out of a dual purpose cow. Where are we going to get the herd? You know that for years, ever since, I think the dairy show at Guelph has been under way, there has been offered a prize of $200 to the beef bred cow that can secure the highest number of points in the dairy test. That prize has been held up for years and as yet not a cow has been produced to win that prize. In Shorthorns alone there are more registered animals than all the other breeds combined and yet not one of those cows have been able, notwithstanding the vaunted milking qualities of Shorthorns, to come forward to win that prize. At Guelph there was only one Shorthorn that scored high enough to win money. At our own show none of them have scored enough points to win money. In view of these facts is it wise for farmers depending on their dairy products to get their profits, to continue to breed with beef bred sires expecting to get milking cows? Farmers who go in for raising milk have to work too hard. They cannot afford to get up year in and year out at four or five in the morning and work Sunday and Monday without getting some profit, and I hold they are not going to get that profit so long as they continue trying to get dairy cows from sires out of beef bred cows. If we are going to get our dairy products up to the standard that it is possible to get them then it is of the greatest importance that we should drop this foolish notion of breeding dairy

cows with beef breeding stock. I have now to ask the meeting to discuss this matter.

Q.—Would you recommend mixing Ayrshire and the Jersey breed for dairying purposes?

A.—No, I would not. A satisfactory cross I find to be Ayrshire and the Shorthorn.

Q.—How many times would you cross?

A.—I think you could go right along. I think you get more benefit from the first cross than from the other crosses, but you go on improving all the time provided you make a wise selection of the sire you use. I think a man going out to buy a young bull has a great advantage because owing to the records being kept of the different breeds he can go out and ask for the records of ancestors of whatever animal he wishes to buy.

Q.—Do you think that the farmers in this country who are pursuing dairying are more prosperous than the men who are pursuing a course of mixing?

A.—I am sure of it.

Q.—Would you advise each breed to keep by itself?

A.—I think so. I think I could take a beef breed and make more money and pay little attention to milk than the man who tries to get both, because he does not get the best of either.

Q.—I understand you to be speaking of a grade herd of milkers. What percentage of those calves are usually heifers?

A.—About a half as a rule.

Q.—What do you do with the male calves?

A.—Take their skins off and feed them to the chickens. A man having good dairy cows can afford to throw his male calves in the manure heap and still be ahead. In Mr. Drury's speech at Guelph, he stated that some of his dual purpose cows gave him $48 worth of milk in the year. If he had said that the average production of his herd was $48 it might have been a fairly good average for a Shorthorn grade. But he did not, and even if he did that, he is a long way behind the average of the best dairy grade herds. I have here the results from twelve men who sent in their returns from the cheese factory in the Western Ontario competition. These were graded herds and they ran from $62.50 down to $40.51. I take it that dairying is too hard work for a man to do for small wages. If you are going to ask your sons and daughters to stay with the business it behoves you to put in their hands cows that will give them a good profit for their work.

Q.—Did the man who got $48 receive the same price for his milk as the man who got $60.

A.—Those twelve men were all on the same basis.

Q.—I would like to ask Mr. Clark if he knows what kind of milk they get in the City of London?

A.—I do not know.

Q.—Ninety per cent. of the milk that goes into London, England, is Shorthorn milk from dual purpose cows. There is where you get competition. That is where they have to get profit out of everything and where they have studied this question more than we have in Canada and they have come to the conclusion that they can make more money out of the dual purpose cows and make enough milk to supply London. Not only that, but where they have cows coming in from every country in the world, the Shorthorn has stood up there and taken prizes as a milk producer more than the representative of any other breed. Mr. Clark touched a vital point when he spoke about the farmers getting a good profit. I can tell you that the families of the

people who are pursuing a special dairy course cannot get half paid, and when you go into the place you see broken down girls in three or four years. Go on the other hand to a farmer's place where they have cows that breed steers that will make a profit and get milk as well and you will find the women there are not broken down in that way. (Applause). I have spent a few days travelling through a special dairy country where they do not know what a good beef steer is, and I found half of the cows lying on the heap. Mr. Clark tells you that the prize at Guelph has been held up. There are reasons for that. Our cows do not come in the right time. It has not been customary to have our Shorthorn cows coming in and making a good competition.

Mr. Clark: Mr. Miller says we ought to be fair, but the importers who have been going to England year after year bringing out Shorthorns have not been fair or they would have brought some of those Shorthorns out here. (Applause). If you advocate dairy Shorthorns in this country you have got to bring them here to take them up. (Hear, hear). We have not got them, and it stands to reason that if the Shorthorn breeders of this country are going to advocate dairy Shorthorns they have got to bring dairy Shorthorns to make good. So far as the argument is concerned that they do not come in at the right time, I can assure you they would be in at the right time if they thought they could win. (Applause). I know a man who bought a cow that stood very high in the dairy test. She won the highest honors in the dairy test. He bought two more of the same family thinking that he was going to get good milkers but he did not. That is the trouble with the Shorthorn.

Prof. G. E. Day: I was brought up in a beef section in the county of Wellington and everybody in that section fed steers. In the adjoining township there was comparatively few steers fed. That was twenty-five years ago. They could get in our section half a cent more for their steers than in that next township for perhaps equally good steers. Now why was that? The reason was that there were so many good steers in our particular section that the buyers all flocked in and there was keen competition whereas in the other section it was so far to drive that competition was not so keen. I think anyone can understand from that illustration that it would be a very difficult matter attempting to raise steers in a dairy district or attempting to raise dairy cows in a beef section. In our own section we tried to raise for the cheese factories and they miserably failed. Here I can easily understand that a man starting out in beef breeding would have a hard row to hoe because he is in a dairy district. Every man will have to govern himself according to the conditions. I believe there is a place for the dairy cow, for the special purpose dairy cows, and for the special purpose beef cow and there is, I have no doubt, a place for the beef cow that will produce milk. But what might be a good place for the one might not be a good place for the other.

JUDGING BEEF CATTLE. (Illustrated.)

By Mr. Robert Miller, Stouffville.

This is a very perfect specimen of a steer. It is about 24 months old, and that, according to Professor Day and a great many other authorities, is the best age and most profitable age at which to sell beef cattle. This steer has been bred and kept and fed for special purposes—purely for beef purposes. The chances are that his dam was a good milker, and the chances

are also that her milk was not very rich milk. I want to say here what everybody does not know, and what I found out myself not very long ago, that what we consider on the table a very poor milk will grow the best calf. If has been proved that for rearing a calf and bringing it at an early age to the very best stage of perfection you should have Holstein, or milk as poor as Holstein milk. If I was going to find any fault with this steer I would say it stands a little bit too high from the ground. The first view you should take of any animal is to stand away from him and see how you like him. If you are going to buy one out of the lot, you will not buy one that does not impress you on first appearances. If you do like him you will get a bit nearer and take a careful look at him. General appearances should be the first feature you should look at. If the steer is not too wild, you might get your hand on it and feel him over. Find whether his shoulder blades are well covered, whether he has a good neck vein. Fine long hair indicates good feeding qualities and a good constitution. Then you find whether the loin is good for that is a most important part, then you find that he has good rump steaks, you have a good round here. That is an important part. You have a good flank here and that goes to show that he is a good feeder. You also notice that his ribs are well covered.

Q.—Is there anything that indicates the quality of the flesh?

A.—A mossy, sappy coat of hair will indicate that you will get a sappy, juicy flesh.

Q.—Can you feed them too fat?

A.—We should not feed them too much past two years old. I do not think a person can emphasize too much the point made by Prof. Day when he said you should never let your cattle stand still. We all know that a great many people have turned out cattle in the spring of the year and perhaps let them return in the fall in no better condition. That time and feed was lost. We might keep them for ten years like that and get nothing. We should keep gaining a little bit all the time. It is very easy to feed them too fat, but not a common mistake.

Q.—Can you tell how the feeding of that steer was carried on?

A.—Mr. Leask is here and perhaps will tell us.

Mr. Leask: I both bred this steer and fed him. He sucked his dam until he was about nine months old, at the same time he was fed with turnips and oats. He is a spring calf and we kept him in both summers. In the winter we gave him all the turnips and clover hay he could eat.

HOW TO PROFITABLY INCREASE THE PRODUCTION OF THE AVERAGE DAIRY COW.

By H. H. Dean, Professor of Dairying, O.A.C., Guelph.

In the topic assigned to me there are four main points to consider and in addition, the question, How? The prominent features in the subject are: "Profit," "Increase," "Production," "Average Cow." A word on each of these before taking up the question of How?

By "profit" in the dairy we understand the excess of returns over the cost of production. The chief factors entering into the question of cost of production are land, labor, and capital invested in cows and feed. No person can show a profit in the dairy unless the returns from dairy products exceed rent value of land, fair wages for the farmer and his help—hired or

otherwise, and interest on capital invested in live-stock, implements, and feed grown on the farm or purchased elsewhere. There is a very great need of our farmers doing some book-keeping. Two books should be found on every farm— an ordinary account book and a bank book. The great majority of dairy farmers are unable to say whether or not they are making a profit from their cows. This is scarcely consistent with modern methods of advanced agriculture.

It is said of the millionaire, Andrew Carnegie, that the watchword of the Pittsburg Steel Mills, while he was the owner, was "more steel and more profits each year." No matter what the production was in any year, he always looked for an *increase* the following year. He was able to enthuse all his men with this idea of *increased production* and *increased profits* each and every year. We are not holding up this as an ideal for dairy farmers, nor asking them to strive to become millionaires, as this is a very low standard of life; but many dairy farmers could with profit to themselves and value to their locality catch something of the spirit that animated the men connected with the Pittsburg steel mills. If a cow gives 4,000 pounds of milk or makes 160 pounds of butter this year; expect 5,000 or 6,000 pounds of milk and 200 to 250 pounds of butter next year and 8,000 to 10,000 the next year and thus increase the production and profit from the herd. It is seldom we receive more than we look for or expect. Expect increases, and increases are likely to come, *if we do our part*.

Production is a law of nature. The trees produce fruits: plants, flowers and beauty; animals, products of value to man, and man ought to be no exception to the rule. That man's life may be considered a failure which has not produced something of value to himself and his fellow men. The man, who by his skill and intelligence is able to increase the average milk production of cows by so much as 1,000 pounds per year is a benefactor of his race—much more so than the man who causes two blades of grass to grow where one grew before, because milk is a life-giving fluid for man and more valuable than grass.

The "average cow" is a conception of the mind and does not exist. It is well that this is so, else improvement of cows would be much slower than at present. The thing called "average cow" is the quotient, resulting from adding together the numbers representing "poor," "medium" and "good" cows and dividing by three. From the modern dairymen's viewpoint there should be no "poor" or "medium" cows. By recognizing only one class of cows, "the good" the labor of obtaining profitable production in the herd is reduced two-thirds. To be relieved of two-thirds of a load is an important point when travelling over a somewhat long and heavy road, such as must be travelled by most dairymen.

The How: The how is an "oft repeated tale," yet not necessarily a "long tail." The process may be summed up in three short words, *Breed, Feed, Weed.*

We shall discuss in detail only the first point, *Breed.* We use the term in the sense of, to procreate,to beget, and not as applied to some special strain of cows. There are men who become excited as soon as the term "breed" is mentioned. Men who under ordinary circumstances are quite sane, become insane at the very mention of "breed," hence on public occasions it is seldom advisable to discuss "breed" in the ordinary acceptation of the meaning of the term. Judging from the way some men talk and write we shall soon need special lunatic asylums for persons suffering from breed-mania.

This is an age of inquiry. Not many years ago the "common people" accepted as the truth what was taught them in the synagogue and elsewhere and no one questioned the authority of the teacher. Maxims and sayings that have stood for the truth during many years are now being questioned. Have not many of us written the maxim, "Honesty is the Best Policy" many, many times in the old fashioned copy-book or as a penance for some misconduct at school? But in these modern times we are told that honesty is not a "policy," it is a *principle* or *axiom*. The word "policy" has degenerated in its significance now meaning much the same as "diplomacy," which latter term someone has defined as "polite lying."

At the meeting of the Eastern Dairymen's Association held in the Capital City, January, 1907, we were told by an eminent authority that "a little learning is *not* a dangerous thing." We can fancy how Pope must have writhed in anguish of spirit as the truth of this saying of his was questioned. His raspy irritable temper must have reached fever heat, though the month was January—on Mother Earth.

This brings me to the discussion of the maxim, which has long been considered the keystone of the breeder of domestic animals, viz., "Like produces like." In a discussion of the truth or otherwise of this maxim, it is not necessary to become excited or to say hard things of any one who questions the wisdom of that which has so long been regarded as truth. Let us look at the facts in a calm, inquiring manner and as seekers after the truth.

A prominent biologist tells us that everywhere he went in the domain of biological science he was met with the barrier, "no thoroughfare. Moses." In these modern times we frequently see barriers such as, "No thoroughfare. Tradition." "No Thoroughfare. Public Opinion." "No thoroughfare. Prominent Men." "No thoroughfare. Text Books." "No thoroughfare. Government." Nothwithstanding these barriers we make bold to question the truth of the maxim, "Like produces like."

First we may inquire what is reasonably meant by the term. We think it fair to infer, a something which we can comprehend with our senses produces or begets a something else which exactly corresponds with the first something, in form, color, etc. If this were true there would be no variety or improvement in nature. Nature abhors sameness, but loves variety. We have only to open our eyes to realize the truth of this statement. If "Like produces like" then the theory of descent, transmutation or evolution falls to the ground. According to Hackel, "The Theory of Descent or the Transmutation theory affirms that all organisms (viz. all species of animals, all species of plants which have ever existed, or still exist on the earth) are derived from one single, or from a few simple original forms and that they have slowly developed from these by a natural course of gradual change."

One of the fundamental principles involved in explaining the varied forms of life about us is "change." The poet says, "Change and decay in all around I see." A recent writer on the subject of breeding animals recognises this principle, and seeks to explain it by what he calls "The Law of Variation." This seems to us a misnomer. One might as well speak of "The Law of Chance," "The Law of Luck" or "The Law of Weather." We recognise that there are great variations in animal and plant life, but the causes of these are not well understood at the present time.

To bring the question more particularly to the point under discussion we may be allowed to cite a few instances in support of the statement that good cows do not necessarily produce good milkers which is the experience of nearly all dairymen. We may call them facts which indicate that "Like

does not produce like" in dairy cows. We shall give the names of the cows, but not the breed for reasons already mentioned.

Name of Cow.	*Daughters or Granddaughters, Good Milkers.*
Artis Kassie	None. One daughter sold, said to have been good.
Beauty of Norval	One that promises well.
Lisgar's Rose	None.
Mercena 2nd	Two.
Margaret 4th	Two daughters, two granddaughters and one great granddaughter.
Patience	None.
Rena Burnett	One granddaughter.

All these cows, which represent three different "breeds," have stood out prominently in our herd as large producers, but we see how few of their progeny have similar charcteristics. Some may say, this may have been due to the use of poor sires. That may be true, but we were supposed to be using good males.

Time will not permit to go further in this discussion at present. There is great need of careful study and wise experiments on this question which is *the greatest of all dairy problems at present.* Looking about for a theory or hypothesis, as a starting point, we feel that Weisman's, "Germ Plasm Theory" is the best. All good practice is the result of a theory, "which must always be regarded only as an approximation to the truth. It must be understood that it may be replaced in time by another and better grounded theory. But in spite of this admitted uncertainity, theory is indispensable for all true science. It elucidates facts by postulating a cause for these."

In a word the "Germ Plasm Theory," which may be defined as, the hereditary or transmissible stuff theory, says that before any permanent change for the better can take place in animals a change must be brought about in the "germ plasm" which is transmitted from one animal to another. The possible explanation of the fact that it is difficult to get good milkers from good milkers, is that this "abundant milking quality" is an unstable characteristic—a sport. It has not become a permanent characteristic or in other words has not permeated the "germ plasm" or hereditary stuff.

If this theory be correct, the only way known at present by which the dairy farmer may be reasonably sure of obtaining good milkers is to breed for the purpose and have the environment suitable for the development of desired characteristics, and *continue until this acquired characteristic becomes fixed.* Personally, we think that a careful study of this matter will enable the scientist to discover the laws of improvement in the milking qualities of dairy cows by breeding. The science of Embryology we believe to be the key that will unlock the secret. Who will study it and give the results of their study to the people? The main difference in results between the old and new theory will be that good milkers will produce *better* milkers in contradistinction to having poor milkers producing poor or sometimes good milkers and good milkers producing sometimes good, but more often poor milkers, as we have them at present.

The second and third factors in the How, viz., "feed" and "weed" we shall not stop to discuss, as they have been debated these many years. There is practically nothing new to add on these points. For the benefit of those who would like to know the kind of feed given to our famous cow Boutsje, we append the average amounts of feed given daily, the approximate cost of her feed, together with her production in milk and butter and the profits on milk and butter, over cost of feed at the prices given for 120 days—Nov. 1st,

1906 to February 28th, 1907. For November and December, 1906, this cow was in charge of the Dairy Department and during January and February, 1907, she was in charge of the Farm Department. Mr. C. S. Wood, Herdsman at the Dairy Stable, had charge of her feed and milking during the four months. During November and December the cow was milked four times daily. For the other two months she was milked twice a day. The bulk of her feed was given at two feeds daily. In the evening she was fed long hay and whole mangels in addition to the regular feed. The bulky portion of her ration was prepared by mixing cut hay, corn silage, and pulped mangels for some hours before feeding. The meal was placed on this roughage at the time of feeding. About 1½ ounces of salt for each cow was added to the pile of roughage which was prepared daily for all the cows and out of which pile this cow was fed. She was given water at will. The amount of water drunk by her was weighed one day in November and it was found to be over 200 pounds.

Boutsje's Feed and Milk.

Following is a record of the pure-bred Holstein Cow, Boutsje, owned by Ontario Agricultural College, Guelph, Canada, the kind and cost of feed, the milk and butter record, and the profit over cost of feed for 120 days:

Boutsje's Feed: November, 1906: Cost of feed for month of 30 days, $8.34.

Ration per day: Clover hay, 10 lbs.; silage, 20 lbs.; mangels, 40 lbs.; bran, 8 lbs.; oats, 6 lbs.; oil cake meal, 2 lbs.; corn chop or gluten feed, 1½ lbs.

December, 1906: Cost of feed for month of 31 days, $8.

Ration per day: clover hay, 10 lbs.; silage, 20 lbs.; mangels, 40 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2½ lbs.; corn chop, 2½ lbs.

January, 1907: Cost of feed for month of 31 days, $7.95.

Ration per day: Clover hay, 10 lbs.; mangels, 40 lbs.; silage, 25 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2 lbs.; corn chop, 2 lbs.

February, 1907: Cost of feed for month 28 days, $7.

Ration per day: Clover hay, 10 lbs.; mangels, 20 lbs.; silage, 40 lbs.; bran, 5 lbs.; oats, 5 lbs.; oil cake meal, 2 lbs.; corn chop, 1½ lbs.

Hay per ton, $8.00, Silage and Mangels $2.00, Bran, Oats and Corn 1 cent per lb. and Oil Cake Meal 1.75 cents per lb.

Boutsje's Milk—November, 2,522 lbs.; 3.5% fat; average lbs. milk per day, 84.06
December, 2,352 lbs.; 3.7% fat; average lbs. milk per day, 75.90
January, 2,105 lbs.; 3.6% fat; average lbs. milk per day, 67.90
February, 1,770 lbs.; 4.1% fat; average lbs. milk per day, 63.21

Total lbs. milk in 120 days..... ...8,749
Total lbs. butter in 120 days..... 377

Value of milk at $1.00 per 100 lbs, $87.49.
Value of milk at 4c. per quart, $139.84.
Value of butter at 25c. per lb., $94.25.

Cost of Feed for 120 days (approximately), $31.00.

Profit on milk over cost of feed, $56 or $108.
Profit on butter over cost of feed, $63.

RESULTS OF PRACTICAL EXPERIENCE IN THE KEEPING OF COW RECORDS.

By W. F. Stephen, Huntingdon, Que.

We have heard an interesting address from Prof. Dean on this very important subject of how to raise more productive dairy cows: As a manufacturer pays more attention to the details of his business in order that he may realize a larger profit, so also should the dairyman study his with the same end in view. I think that most of us are looking for more profit, and how that profit is to be obtained is interesting to most of us. Prof. Dean has said that he wants to set us thinking, for when we can get a man to think we can get him to act. Now the idea of my talk is to get you acting. How many dairymen are there here that keep cow records? I am glad that there are a few. Cow records are of modern institution. They were started in our country some seven or eight years ago, but we find that many dairymen had kept cow records in the United States upwards of fifteen or twenty years. There is only one way of proving what our cows are doing, and that is by keeping records, and I am to give you the results of a little practical experience. In order to do so I have to touch a little on my own business, although I do not care much about doing it. I first commenced this work in 1902, but previous to that I had been endeavoring to build up a good dairy herd by the selection of the best bulls I could get in the country and mating them with the best females and rearing their produce in the way that I think they should be raised for dairy work. I was fairly successful but I realized that I was not getting the returns I should, I began to realize that it was only business that I should know what I was doing, as the manufacturer tries to find the cost of the production of his manufacture, and what he is doing each year. I would point to the fact that many of us do not know what our herds are doing because we do not know how many cows we have that are boarders. I wanted to find out this for myself. I had received a great many letters from the United States each year asking the price of my young stock, and the question that was invariably asked was, what were the records of the dams. I could not give them because I had never kept any, but I started in 1902, and a year after I was able to give the record of the dams for that year. That is one reason why I wanted to keep cow records, but I also wished to find out the valuable cows in the herd, and then to weed out the poor ones; to know the effect of feeding on the milk flow, the cost of food in comparison, and other things which enter extensively into profit and loss and so I turned my attention to the scale. Let me call your attention to it. The scale is a very simple arrangement, and does not cost very much. Four dollars will purchase the weighing scale, and the milk forms you can make for yourself or get them from Ottawa, and so equip yourself for the most practical work you can carry on in connection with dairying, the most valuable and most instructive in the conduct of your farm. Let me say also that there is no better way of getting the boys and girls interested than by giving them charge of this department. They will take a great interest in the milk returns from day to day, noting the ups and downs, beginning to wonder at them and to inquire as to the cause. Now as to the time it will take each day. It will take just one half minute to weigh each cows milk each day, and you will find that no better investment can be made, nor time better spent than in weighing each cow's milk. If you don't care to weigh it every day you can do it one day per week, and that will be found sufficient to give you a record that will convey much valuable information. Composite samples of

milk should be taken every month. The Babcock tester, or four bottle machine, only costs $6. Any intelligent man after a little practice, and closely observing the method will be able to make the tests. But if you don't want to do this work yourself get the tester at the creamery to do it for you. By a simple test you can find out the quality of the milk, and every month or six weeks you will be able to see which of the cows you are keeping as boarders and which at a profit. Let me give you a few figures. In 1902 when I commenced keeping records I had seventeen cows in my herd, four being only two year old heifers that dropped their first calf in the month of July, but which I have taken into the average. The average for that year was 6,250 pounds of milk over an average milking period of 280 days, percentage of butter fat 3.8 per cent. equal to 269 pounds of butter which at twenty two cents a pound gave an average for the year of 59.36. Now the best milker gave 9,907 pounds of milk, testing 3 per cent. butter fat, equal to 347 pounds of butter, value $76.34. I had another cow that did not give as much milk but a greater proportion of butter fat. The amount of milk I got from this cow was 8,584 pounds, testing 4 per cent, butter fat, equal to 400 pounds of butter worth $88. Now the difference of the value of the product of these two cows was $11.64 although this one gave the most profit and was milked 274 days, and the one which gave the most milk 300 days. The poorest cow in the herd gave 4,159 pounds of milk testing 3.7 per cent. butter fat, equal to 181 pounds of butter, value $39.82, the best cow's output being worth more than double that of the poorest's. The result of that year's work was that two of the boarders went to the butcher. I did not set the standard too high, fixing it at 6,000 pounds, and others that did not reach it I decided to give a chance for a second year to get up to that standard. In 1903 I had a herd of twenty-two cows and some heifers and the average yield of milk was 64 pounds lower that year than in the previous one, but the test for butter fat showed 3.95 per cent. giving the higher average of 286 pounds of butter worth $62.08. The best cow that year gave 8,129 pounds of milk, testing 4 per cent. butter fat, valued at $83.60. The best cow came within $4.40 of that of the previous year, and the poorest gave 3,341 pounds of milk, testing 3.7 butter fat, equal to 145 pounds of butter, worth $31.90 the value of the return of the best cow being $41.70 more than the poorest. In 1904 I had added four more cows, having twenty-six in all, and the average for the year was 6,646 pounds of milk, testing 3.9 per cent. giving 306 pounds of butter having a value of $67.07. The best cow gave 8,450 pounds of milk, testing 4.1 per cent. butter fat, giving 403 pounds of butter, worth $88.66, and the poorest 5,220 pounds of milk, testing 4.1 per cent. of butter fat, equal to 248 pounds of butter worth $54.36, the value of the return of the best cow being $34.30 more than that of the poorest. In 1905 I had increased my herd to 28 cows. The average yield of milk was 6,956 pounds, testing 3.9 butter fat, equal to 321 pounds of butter having a value of $70.75. The best cow gave 8,944 pounds of milk, testing 4.1 per cent. butter fat, equal to 427 pounds of butter worth $93.94. The poorest cow gave 4,635 pounds of milk, testing 4.6 butter fat, equal to 248 pounds of butter worth $54.56, or $39.38 below the return of the best cow.

The result of my four years work shows that I have increased the average yield of milk by 706 pounds, giving 52 more pounds of butter, and increased the value by $11.39. That is the result of four years of keeping cow records. The records are not very large but they have enabled me to weed out poor cows and to find out the true value of each of my herd. The weighing of my milk has enabled me to find the effect that the weather has on the milk flow. I found out that the effect of cold chilly weather was to pull down the

milk flow from three to four pounds a day, and my aim is to obviate that by extra feed, although that will not always do it. I have the same difficulty in the winter time, and I found it best to keep my stable at a temperature of from fifty to fifty-five degrees, but during very cold weather when we have it exceedingly cold it is difficult to keep the temperature up to fifty, and I found that when the temperature in the stable dropped to forty that it affected the milk flow and caused an average drop of about three pounds a day per cow.

Q.—What about the cold rains?

A.—That also affects the flow. It is a difficult thing to obviate. If you have wood shelter where you can run the cows into it will help. I tried keeping them in the stable, but that does not do. The cold rains in the summer is one of the difficult conditions to deal with. The keeping of records has enabled me to ascertain the effect of feed on the milk flow. There are so many things which indirectly as well as directly have an influence on the flow of milk. If cows are accustomed to be fed at a certain time, and they are not they will worry and fret, or if they are chased by dogs, it will have an effect on the milk flow, which we do not discover until we have weighed the milk for some time. That is the great object in testing the milk from day to day, and I find it pays to weigh each day instead of once a week. Another point which I would like to mention is that for fourteen years my cows have never been turned out of the stable, from the time when they have gone in from the field about the middle of November until the first day of May, and they are stronger, healthier, and more vigorous than they were when they were turned from time to time, and there is not a case of tuberculosis amongst them. Of course it is necessary to have the stable well ventilated.

Q.—How often do you feed per day?

A.—I feed three times a day. That is another thing that the scale has enabled me to determine. I have heard a good deal about feeding twice a day, but I get more milk and the cows are in better shape with feeding three times. It has also proved to me the value of succulent palatable feed, and variety in it, which may be given without any great extra expense. The concentrated feed I use mostly is four pounds of bran, four pounds of oats with a little barley, and two pounds of peameal or gluten meal, which can be varied by the substitution of cotton seed meal for the pea meal or gluten and a pound of oil cake. We milk before feeding always in the morning and in the afternoon, and I feed liberally whether the cows are dry or not as I always want my cows to be in working condition, so as to drop a good calf, vigorous and ready to give a good milk flow after they freshen. I think there is little benefit in cut straw, except that it acts as a filler, but I get just about as good returns from a little cut straw fed with silage with the addition of 10 lbs. of mixed hay as from silage and hay.

Answering further questions, Mr. Stephen said that the use of shorts was all right except, perhaps, that they were a little fine. He did not feed turnips on account of their giving a flavor to the milk, and at the creameries in his district, and at Montreal, milk from turnip fed cows would not be accepted on that account. That was an argument in favor of the use of silage, which gave no distinctive flavor to the milk. He found it productive of the best results to water regularly four times a day, giving fresh water each time for water kept in front of the cows was liable to go bad. It might pay to temper the water but he had not tried it.

Mr. Stephen emphasized his remarks as to the results he had obtained during the four years in which he had kept records, and proceeding said

that after making allowance for the cost of feed, etc., he was left in 1905 with a profit of $32.75 per cow. In addition there was the further profit from the manure. He maintained that it was possible for a man by adopting the methods he had advocated to increase the output of his cows by 1,000 pounds of milk per year, which meant if the system were universally adopted $20,000,000 more for the farmers of Canada. Watch the milk scale, and the milk flow, were the maxims that he urged they should follow.

FINANCIAL STATEMENT

OF THE EASTERN ONTARIO LIVE STOCK AND POULTRY SHOW

To January 31, 1907.

RECEIPTS.

Cash on hand	$760 40	
Legislative Grant for Show of 1906	4,300 00	
Legislative Grant for Show of 1907	4,300 00	
Legislative Grant to Seed Department, 1906	125 00	
Dominion Government Grant, Selling Class	42 00	
Advertising in Prize List	50 00	
Gate Receipts	339 20	
Fees for Entries and Poultry memberships	1,134 40	
Sale of Carcasses and Hides	1,023 94	
Poultry sold, Selling Class	125 50	
Dressed Poultry Sold	20 90	
Canadian Holstein-Friesian Breeders' Special prize	95 00	
Canadian Ayrshire Breeders' Special prize	15 00	
Miscellaneous	6 00	
		$12,337 34

EXPENDITURES.

Directors' Expenses	$167 45	
Secretary's Salary	300 00	
Postage and Stationery	113 00	
Printing and Advertising	494 76	
Office help and Expenses at Show	380 72	
Telegraph, Telephone and Express	67 79	
Judges and Lecturers	405 45	
Superintendent and Assistants	307 26	
Refund of Freight on Exhibits	232 00	
Expenses of Poultry Representatives to interview Minister of Agriculture, at Toronto	28 70	
Cash paid for Prizes	3,994 50	
To pay overdraft of Poultry Association	757 89	
Refunds of Entry Fees	63 75	
Birds sold, Selling Class	125 50	
Sale of Carcasses and Hides	1,025 92	
Heating Building	49 60	
Lighting Building	25 50	
Straw, Sawdust and Shavings	55 79	
Auditor	9 00	
Rent of Cots and Chairs	14 80	
Cleaning Stables after Show	15 00	
Block Test Expenses	19 16	
Poultry Feed and Supplies	53 67	
Dressed Poultry sold	20 90	
Reporting Meetings	60 00	
Miscellaneous	7 59	
		8,795 70
Cash on hand		$3,541 64

Examined and found correct,
this 2nd day of March, 1907.
(Signed) J. M. DUFF,
Auditor.

(Signed) J. C. SMITH,
President.
(Signed) A. P. WESTERVELT,
Treasurer.

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Vice-President.....N. F. Wilson, M.P., Cumberland.
Secretary-Treasurer.....A. P. Westervelt, Parliament Buildings, Toronto.

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Committee on Poultry.—John A. Belford, A. W. E. Hellyer, Geo. Higman, F. J. Blake, Almonte; Geo. Robertson, Ottawa; W. F. Garland, Galt; E. Brown, Pt. Fortune, Que.

Committee on Seeds.—George Boyce, B. Rothwell, F. Bradley, J. C. Stuart, G. H. Clark, L. H. Newman.

Advertising Committee.—J. C. Smith, J. H. Grisdale, John A. Belford and A. P. Westervelt.

Reception Commitee.—J. C. Smith, His Worship the Mayor of Ottawa, Ald. Rosenthal, G. H Higman.

Live Stock Superintendent.....Jos. Whitehead, Ottawa.
Poultry Superintendent.....R. E. McKinstrey, Ottawa.

ONTARIO HORSE BREEDERS' ASSOCIATION.

ORGANIZATION: At a meeting of horse breeders and others, held at the King Edward Hotel, on Friday, December the 28th, it was decided to organize an Association to be known as the Ontario Horse Breeders' Association, and incorporated under the Agricultural Associations Act.

Mr. C. C. James, Deputy Minister of Agriculture was in attendance at the meeting. Others present were,—T. A. Graham, Wm. Smith, Peter Christie, M.P., Dr. Andrew Smith, John Bright, John Boag, J. M. Gardhouse, John Gardhouse, George Pepper, E. C. H. Tisdale, W. J. Stark, James Torrance, A. G. Gormley, John J. Dixon, James Henderson, and H. M. Robinson.

Mr. T. A. Graham, of Claremont, was elected Chairman.

Mr. C. C. James was asked to address the meeting, and made the following suggestions for the Constitution of the Ontario Horse Breeders' Association:

The membership should consist of the members of the following Associations residing in the Province of Ontario, and who have recorded at least one pedigree as breeder or importer during the preceding calendar year, provided the Article following has been complied with:—The Canadian Clydesdale Association, The Canadian Shire Association, The Canadian Hackney Society, The Thoroughbred Horse Association, and any other Association which may be approved of by this Association, formed for the object of recording pure-bred horses, and whose admission has been approved by the Minister of Agriculture.

2. Each of the above named Associations should pay annually on or before the 15th of January of each and every year, $15 if the membership from that Association is under 50, and $30 if the membership from that Association is between 50 and 100, and $30 additional for each subsequent 100 or fraction of 100.

3. The Directors should be appointed at the annual meeting of the Association, and each Association represented should be entitled to two Directors for every 100 members or less, and one additional Director for each additional 100 members.

After some discusssion it was moved by PETER CHRISTIE, seconded by Dr. ANDREW SMITH, "That those present form the Ontario Horse Breeders' Association; that a Constitution be drafted, taking as a basis the suggestions made by Mr. James." Carried.

It was decided, however, that representation should be given to the Canadian Standard-bred Trotting Association, and the Canadian Pony Society, with the understanding that these two Associations should become incorporated under the Dominion Act respecting Live Stock Record Associations, during the next calendar year.

The following provisional Directors were appointed:—

Clydesdale Association: John Bright, John Boag, Jas. Torrance, A. G. Gormley, T. A. Graham, Peter Christie, M.P., Wm. Smith, Jas. Henderson.

Shire Association: J. M. Gardhouse, John Gardhouse.

Hackney Society: E. C. H. Tisdale, W. C. Renfrew.

Thoroughbred Society: John J. Dixon, Dr. Andrew Smith.

Standard-bred Association: Geo. Pepper, Jas. Wetheral.

Pony Society: W. J. Stark, H. M. Robinson.

A committee consisting of Wm. Smith, J. M. Gardhouse, T. A. Graham, Wm. Hendrie, Geo. Pepper, and W. J. Stark, was appointed to meet with A. P. Westervelt to draft a Constitution.

The meeting then adjourned, and arrangements were made to meet on Friday afternoon, January the 4th, to make arrangements for holding an Exhibition.

COMMITTEE ON CONSTITUTION

This Committee met at the Walker House on Thursday, January the 3rd, at 8 p.m.

There were present at the meeting; Wm. Smith, T. A. Graham, Geo. Pepper, J. M. Gardhouse, W. J. Stark, and A. P. Westervelt.

Mr. Wm Smith was appointed Chairman.

A Constitution was drafted, and it was decided to submit same to the meeting to held on the 4th of January. The meeting then adjourned.

ONTARIO HORSE BREEDERS' ASSOCIATION.

At the meeting held at the King Edward Hotel, on Friday, January the 4th. at 2 p.m., there was present, Wm. Smith, John Bright, John Boag, Jas. Torrance, A. G. Gormley, George Pepper, J. M. Gardhouse, Peter Christie, T. A. Graham, Jas. Henderson, E. C. H. Tisdale, W. C. Renfrew, H. M. Robinson, Dr. Andrew Smith, W. J. Stark, and A. P. Westervelt.

The minutes of the previous meeting were read and adopted, after which the Constitution as drafted by the Committee was read.

It was moved by Wm. Smith, seconded by J. M. Gardhouse, "That the Constitution as read be adopted; that the Provisional Directors named at the previous meeting shall constitute the members of the Association until such time as the Accountant of the National Live Stock Records can supply the names of the members from the various Record Associations, and further that the Board of Provisional Directors should constitute the Board of Directors of the Ontario Horse Breeders' Association for 1907." Carried.

The election of officers was then proceeded with, and resulted as follows:

OFFICERS FOR 1907.

President: Wm. Smith, Columbus.

Vice-President: T. A. Graham, Claremont.

Secretary-Treasurer: A. P. Westervelt, Toronto.

Auditor: J. M. Duff, Guelph.

Executive Committee: Wm. Smith, T. A. Graham, A. P. Westervelt, J. M. Gardhouse, John Bright, George Pepper.

Representatives to London Exhibition: Jas. Henderson, Wm. Mossip.

Representatives to Ottawa Exhibition: Peter Christie, T. A. Graham.

Moved by George Pepper, seconded by J. M. Gardhouse, "That our President, Mr. Smith, be appointed as our representative to the Canadian National Exhibition, and that the Secretary be instructed to write to the Manager of the Exhibition to make arrangements to grant us the representative on the Board." Carried.

Moved by George Pepper, seconded by A. G. Gormley, "That the appointment of the Committee to interview the Minister regarding the grant, and the appointment of the Committee to look into the question of a suitable building for the show be confirmed, and that we ask for their report." Carried.

W. J. Stark moved, seconded by John Bright,—"That the following gentlemen be appointed a Soliciting Committee, to obtain subscriptions, W. C. Renfrew, Jas. Torrance, John Boag, and W. J. Stark." Carried.

Moved by John Bright, seconded by Jas. Henderson, "That the arrangement of the prize list be left to the Executive Committee, with the addition of W. J. Stark to represent the Pony classes, and that a meeting be held at the Walker house, Thursday evening, January the 10th." Carried.

Moved by George Pepper, seconded by A. G. Gormley, "That the Show be held on Wednesday, Thursday, Friday and Saturday, February 20th, 21st, 22nd and 23rd, 1907." Carried.

The following Judges were appointed:

Ponies: Dr. D. King Smith and Lancelot Struthers.

Standard Breds: Robert Graham, and O. B. Sheppard.

Clydesdales and Shires: Jas. Torrance and Jas. Henderson.

Hackneys: Wm. Gibson and Captain Robson.

Thoroughbreds: Major Hendrie and Mr. Fuller.

The meeting then adjourned.

The constitution of the Ontario Horse Breeders' Association as adopted at the meeting on January 4th, 1907, and approved of by the Hon. Nelson Monteith, Minister of Agriculture, reads as follows:

CONSTITUTION OF THE ONTARIO HORSE BREEDERS' ASSOCIATION.

1. This Association incorporated under "The Agricultural Associations Act," shall be known as the Ontario Horse Breeders' Association.

2. The object of this Association shall be: To encourage a general and constant improvement in horse breeding and a better organization of the interests of the breeders of horses throughout the Province:

(1) By co-operating with the Department of Agriculture.

(2) By holding meetings to discuss matters of importance to the horse industry of the Province.

(3) By co-operating with Exhibition and Live Stock Associations and Societies to advance the interest of the live stock industry generally, with special reference to the interests of the horse industry.

(4) By holding or assisting to hold competitive exhibitions and educational meetings.

Membership.

3. The membership shall consist of the members of the following Associations residing in the Province of Ontario, who have recorded at least one pedigree as breeder or importer during the preceding calendar year, provided Article 4 has been complied with:

The Canadian Clydesdale Association.
The Canadian Shire Association.
The Canadian Hackney Society.
The Canadian Thoroughbred Association.
The Canadian Standard Bred Trotting Association.
The Canadian Pony Society.

And any other Association which may be approved by this Association in accordance with Article 18, if said association has been formed for the object of recording pure-bred horses, and is incorporated under the Dominion Act respecting Live Stock Record Asssociations, and whose admission has been approved of by the Minister of Agriculture for the Province of Ontario.

(*a*) Provided, however, that this shall not prevent the privilege under this article being withdrawn from any of the Associations above named or hereafter to be admitted, if decided by this Association.

(*b*) Provided further that any of the Associations specially named or hereafter admitted, which shall during any calendar year cease to be incorporated as a 'Live

Stock Record Association under the Dominion Act respecting Live Stock Record Associations, shall forfeit all privileges and rights under any Article of this Association.

(c) Nothing in this Constitution shall prevent the expulsion of any member found guilty of dishonorable practices, and any member found guilty of such misdemeanor may be expelled at any annual meeting of this Association.

4. Each Association under Article 3 shall pay annually, on or before the 15th day of January of each and every year, $15, if the membership from that Association is under 50, and $15 additional for each additional 50 members or fraction of 50 members from said Association, eligible for membership in this Association. Each of said Associations shall also supply together with the said fees the list of its members eligible for membership in this Association, which list shall be certified as correct by the Accountant of the National Live Stock Records.

5. The business year of the Association shall commence on the first day of January of each year, and shall end on the 31st day of December following. The annual meeting shall be held at such time and place as the Executive may decide.

6. A special meeting of the Association may be called by the Executive. Notice of each annual and special meeting shall be mailed by the Secretary at least ten days prior to the date of meeting, to each member whose name and address is known to the Secretary. In the case of a special meeting, there shall be given at the same time, a statement as to the purpose for which the meeting is called.

7. Representatives to Exhibition Association, when such are to be appointed, shall be elected at the annual meeting. These representatives shall carry out such instructions as may be given them by this Association.

8. No person other than a member of this Association shall be entitled to vote or take part at any meeting of this Association.

Officers.

9. The Directors shall be appointed at the annual meeting of this Association. Each approved Association shall be represented on the Board of Directors by two Directors elected from among the members from said Association, when the membership from said Association is 100 members or less, and by one additional Director elected from among the members from said Association for each additional 50 members or fraction of 50 members from said Association. The Director of the Live Stock Branch shall be an ex-officio member of the Association and a member of the Board of Directors.

10. The President and Vice-President shall be appointed by the Directors from among themselves at a meeting to be held as soon as convenient after the annual meeting. At this meeting an auditor, or auditors, shall be appointed for the current year.

11. The Secretary-Treasurer shall be appointed from among the Directors or otherwise, by the Directors of the Association, and shall hold office during the pleasure of the Board of Directors.

12. An Executive Committee shall be appointed to consist of the President, the Vice-President, the Secretary and three other Directors, to be elected at the first meeting of the Board following the annual meeting. The Directors may also elect such other committees as may be necessary.

13. Seven members shall be a quorum at any meeting of the Directors and three members shall be a quorum at any meeting of the Executive.

14. The Executive shall meet at the call of the President, or in his absence, of the Vice-President, on at least three days' notice.

Duties of Officers.

15. (a) The duties of the Executive shall be to prepare recommendations for Board Meetings, supervise finance, let contracts and arrange for printing and advertising, make necessary arrangements for holding exhibitions, and deal with such questions as have not been decided by the Board and carry out all matters referred to it by the Board. The President shall be Chairman of this Committee, and the Vice-President shall be Vice-Chairman. If necessary, the Executive may refer matters of detail to a smaller committee.

(b) The President shall preside at all meetings of the Board of Directors, and of the Executive, when present, and shall perform the duties usually appertaining to such office, and in his absence such duties shall be performed by the Vice-President, or in his absence by a Chairman to be chosen at the meeting.

(c) 1. The Secretary shall attend and be present at the meetings of the Association, Directors, Executive and Committees, and keep a true record of the transactions and proceedings at all such meetings, in a book or books, which shall be open to the

inspection of the members thereof at all reasonable times. He shall also as such Secretary conduct all correspondence, issue all press and other reports and notices and prepare for publication the annual report.

2. He shall under the direction of the Executive carry out all arrangements for holding exhibitions, see that the buildings are prepared and ready for use at the proper time, and have all the necessary supplies and equipment ready for the exhibition. He shall, under the direction of the Executive and various Committees, attend to the arrangements of each department, and decide all matters such as the President, or Vice-President, acting in his absence, may not consider of sufficient importance to warrant him in calling a meeting of the Executive to determine. He shall prepare a programme for all exhibitions which the Board may from time to time determine to hold and report as to the staff of assistants necessary for such exhibition, and in general perform all such duties as usually devolve on such an officer under the direction of or subject to the approval of the Executive, and further do and perform all such acts, matters and things as would be required of him by any by-law or resolution or order of the Board of Directors in the office of Manager.

(*d*) 1. The Treasurer shall receive and have custody of moneys and valuable papers of the Association. He shall cause to be entered in books kept for that purpose a correct statement of all moneys received and disbursed on account of the Association, which books shall be open at all reasonable times to the inspection of the members thereof. The Treasurer shall prepare for the annual meeting a complete statement of the receipts and disbursements in which shall be shown the expenses of management, and shall perform such other duties in connection with the finances as may be required of him by the Constitution and the rules and regulations, and by the lawful orders and resolutions of the Board.

2. All funds shall be deposited to the credit of the Ontario Horse Breeders' Association in a chartered bank of the Dominion of Canada, to be selected by the Executive and all payments shall be made by cheque drawn on such bank by the Treasurer and countersigned by the President. In the absence of either of these officials, cheques may be signed by persons duly authorized by the Executive.

3. Accounts may be paid when passed by the President and Secretary, or in the absence of either of them by such person or persons as the Executive may authorize, but all accounts must be submitted to the Executive for inspection at the first meeting following.

4. Accounts for travelling expenses must be given in detail and all payments of $2.00 and upwards must be accompanied by vouchers.

5. Pay sheets of employees shall be certified to by the Superintendent, assistant superintendent, or the official in charge.

(*e*) The auditor or auditors shall annually examine and report upon all accounts affecting the Association, or relating to any matters under its control or within its jurisdiction, for the year ending on the thirty-first of December next preceding each annual meeting, and shall verify the detailed statement to be annually prepared by the Treasurer in such form as the Directors may require, and report in duplicate upon all the accounts audited by him and make a special report of any expenditures made contrary to the Constitution, rules and regulations, and generally do and perform all acts devolving upon auditors or which may be required by the Directors.

16. The actual and necessary travelling expenses may be paid of members of the Board of Directors attending Board meetings, and of the members of duly appointed committees when performing the duties in connection with their office.

17. When practicable the business of the Board or of any Committee may be conducted by correspondence.

18. Any part of this Constitution or any by-laws of the Association may, subject to the Act of Incorporation, be amended or changed at any annual or properly called special meeting, by two-thirds vote of the members present at each meeting.

(*a*) Provided that any member desiring to introduce any addition or amendment to the Constitution or by-laws shall so notify the Secretary in writing at least fifteen days prior to the date of any meeting of the Association, and shall enclose with such notice a copy of proposed addition or amendment. A copy of the proposed addition or amendment shall then be sent by the Secretary to each known member of the Association ten days before the date of holding meeting.

19. The order of business at all meetings of this Association shall be:

1. Reading Minutes.
2. Reports of Officers.
3. Reports of Committees.
4. Election of Officers.
5. New Business.
6. Adjournment.

ONTARIO HORSE BREEDERS' EXHIBITION.

Held in the St. Lawrence Arena, Toronto, on February 20th to 23rd, 1907.

LIST OF PRIZE WINNERS.

Clydesdale Stallions, Foaled Previous to January 1st, 1903.

1st—Acme (imp.) [6187] (10485), bay, face and three legs white, near fore foot white and leg black, foaled June 28, 1897. Bred by Andrew Donnan, Shaddock, Whithorn, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Baron's Pride [3067] (9122); dam, Sibyl Gray [4019] (13049), by Orlando [3046] (8092).

2nd—Prince of Mayfield (imp.) [6095] (12289), bay, face and hind legs white, white stripe on near fore leg, foaled May, 1901. Bred by P. McFarlane, Port Street, Stirling, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Royal Stamp (10442); dam, Lady Clare (14613), by Prince of Carruchan (8151).

3rd—Castle King (imp.) [5753] (12517), black, stripe on face, fore legs white, off hind leg white, foaled March 19, 1902. Bred by Wm. Watson, Millom Castle, Cumberland, Ont. Exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Sir Everest (10917); dam, Nell of Millom Castle (15335), by Londonderry (7934).

4th—Lyon Stewart [2732], bay, stripe in face, white rings on fore fetlocks, hind feet white, foaled June 7, 1898. Bred by Jas. Stewart, Springbank, Ont. Exhibited by H. G. Boag, Barrie, Ont.; sire, Lassodie Rover (imp.) [2725] (9779); dam, Houstin Lassie (imp.) [679], by Waterlee Lyon (2266).

5th—Culdrain Prince (imp.) [6148] (12117), brown, blaze on face, near hind foot white, foaled March 29th, 1902. Bred by Lieut.-Col. C. G. Gordon, Culdrain, Gartly, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Prince Thomas (10262); dam, May of Culdrain (12489), by Maclennan (6048).

6th—Adam Bede (imp.) [4783] (11992), brown, stripe, near fore and both hind legs white, foaled May, 1902. Bred by Adam Gray, Ingleston of Borgue Kirkcudbright, Scot. Exhibited by Ambrose Lewis, Ringwood, Ont.; sire, Baron's Pride [3067] (9122); dam, Sweetmeat [6319] (14595), by Macgregor (1487).

7th—Prince Victor (imp.) [5785] (12707), bay, grey hairs, white face, four white legs, foaled June 26, 1902. Bred by Jas. McLaren, Alton, Stirling, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Royal Favorite (10630); dam, Lilly of Alton (16229), by Sir Everard (5353).

8th—Gallant Barrie (imp.) [4288] (11714), bay, stripe, hind feet white, foaled May 24, 1901. Bred by Jas. Barrie, Aberdeen, Scot. Exhibited by T. D. Elliott, Bolton, Ont.; sire, Prince Thomas [4028] (10262); dam, Balmedie Sweetheart (12831), by Balmedie Prince (7454).

9th—King Alfred (imp.) [5786] (11762), brown, small patch of white on face, near hind foot white, foaled May 24, 1900. Bred by J. E. Scoddart, Howden, Mid-Calder, Scot. Exhibited by J. W. Lowes, Bethany, Ont.; sire, Prince Alexander (8899); dam, Fanny of Howden (13292), by Hyndford (7837).

Clydesdale Stallions, Foaled in 1903.

1st—Baron Richardson (imp.) [5320] (12842), bay, patch on face, four white legs, foaled July 6, 1903. Bred by Alex. MacIntosh, Greenhill, Houston, Scotland. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron o' Bucklyvie [5353] (11263) dam, Minnie of Greenhill [7335] (16213), by Sir Donald [7331] (10456).

2nd—Vigorous (imp.) [6152] (12776), brown, patch on face, hind feet and one fore foot white, foaled June, 1903. Bred by Robt. McDowall, Auchengaillie, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Up To Time (10475); dam, Maggie of Changue (15644), by Belvidere (9128).

3rd—Whinbloom (imp.) [6097] (12785) bay, stripe on face, four white legs, foaled July 6, 1903. Bred by J. C. Robertson, Fodderty, Dingwall, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince Thomas (10262); dam, Gartly Favorite (14322), by Prince of Carruchan (8151).

4th—Dunure Baron (imp.) [6150] (12561), bay, white face, near hind leg grey, other three legs white, foaled May, 1903. Bred by J. E. Kerr, Harviestoun. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire Baron o' Buchlyvie (11263); dam, Scottish Dandy (14389), by Royal Gartly (9844).

5th—Baron Hugo (imp.) [5737] (Vol. 29, S.), dark brown, face, fore feet and hind legs white, foaled May 19, 1903. Bred by Jas. Douglas, Rosebaugh, Avoch, Scot. Imported and exhibited by G. A. Brodie, Bethesda, Ont.; sire, Sir Hugo [4923] (10924); dam, Princess Katrine [8585] (14213), by Prince Albert of Rosebaugh [2888] (9357).

6th—The Nobleman (imp.) [5768] (12770), bay, white stripe on face, foaled June, 1903. Bred by John Meikle, Craigorie, Clackmannan, Scot. Imported and exhibited by H. G. Boag, Barrie, Ont.; sire, Hiawatha (10067); dam, Pearl (15681), by The Most Noble (10657).

Clydesdale Stallions, Foaled in 1904.

1st—Royal Ardlethen (imp.) [6902] (Vol. 30, S.), dark brown, white face, near fore foot and hind legs white, foaled 1904. Bred by Thos. Winter, Meaburn Hall, Crosbie, Eng. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, Ardlethen [4948] (11246); dam, Bella of Meaburn Hall [10076] (18517), by Eastfield Laird [4677] (6720).

2nd—Baron Buchanan (imp.) [6101] (Vol. 29, S.), brown, foaled 1904. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron Robgill (10689); dam, Lily of the Mill (Vol. 29, S.).

3rd—Baron Acme (imp.) [5748] (Vol. 29, S.), black, stripe, little white on outside of fore and inside of off fore foot, hind legs white, foaled June, 1904. Bred by Jas. Main, Tounfoot, Dolphinston, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Acme [6187] (10485); dam, Summit Queen [9651], by The Summit [3752] (9442).

4th—Lord Newlands (imp.) [6468] (Vol. 29, S.), bay, white on face, three white legs, foaled June, 1904. Bred by Robt. Pate, South Draffan, Lanarkshire, Scot. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Good as Gold [6153] (11733); dam, Bell of Draffan [8308] (13229), by Rosedale (8194).

5th—Sir Henry (imp.) [6104] (13200), bay, foaled 1904. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince Thomas (10262); dam, Gem (16106).

6th—Gallant James (imp.) [5752] (12985), brown, foaled May 7, 1904. Bred by Jas. M'Alister, Meikle, Kilmony, Scot. Imported and exhibited by Andrew Aitchison, Guelph, Ont.; sire, Baron of Bucklyvie (11263); dam, Jessie (13147), by Prince Gallant (6176).

7th—Ardlamont (imp.) [5759] (12803), bay, white face, small white spot on near side of lower lip, hind legs white to hocks, foaled May 8, 1904. Bred by Neil Nicholson, Auchgoyle, Scot. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, The Real Mackay [5769] (11968); dam, Darling of Auchgoyle [10059] (16985), by Toward Castle [5239] (9863).

8th—Prospector (imp.) [6145] (Vol. 29, S.), bay, foaled 1904. Bred by Jno. Paterson, Wester View, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Lord Londonderry (10585) dam, Fanny of Brownfield (Vol. 29, S.).

9th—Blacon Hero (imp.) [5747] (12865), bay, stripe, fore ankles and near hind ankle white, little white on off hind hoof head, foaled June 4, 1904. Bred by A. Morrison, Craigberoch, Rothesay, Scot. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Pride of Blacon [4072] (10837); dam, Tibbie, by General Lockhart [5749] (8425).

Clydesdale Stallions, Foaled in 1905.

1st—Baron Columbus (imp.) [6106] (Vol. 29, S.), bay, foaled 1905. Bred by Mr. Dow, Littleton, Girvan, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Baron of Buchlyvie [5353] (11263); dam, Peebles Mare [9177], by Montrave Mac [3087] (9953).

2nd—First Baron (imp.) [6413] (Vol. 29, S.), bay, blaze, four white legs, foaled 1905. Bred by Jas. Hamilton, Drumburle, Ayr, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Hiawatha [3430] (10067); dam, Jean of Drumburle [9879] (Vol. 29, S.), by Triumph [6414] (9864).

3rd—Passport (imp.) [6107] (Vol. 29, S.), bay, foaled 1905. Bred by Jas. Paterson, Burnbank, Blair Drummond, Scot. Imported and exhibited by Smith & Richardson, Columbus, Ont.; sire, Marmion (11429); dam, Mayflower [9178] (Vol. 29, S.), by Baron's Pride [3067] (9122).

Clydesdale Mares, Foaled Previous to January 1st, 1904.

1st—Meg (imp.) [9408] (Vol. 28, S.) bay, face and legs white, foaled May 26, 1903 Bred by A. S. Ritchie, Fancy Farm, Greenock, Scot. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Elator [5080] (10340); dam, Daisy of Fancy Farm [9407] (14783), by Prince Frederick [3473] (8905).

2nd—Ardyne Bell (imp.) [10029] (Vol. 28, S.), black, hind legs white, foaled May, 1903. Bred by D. & J. Miller, Berfern Farm, Innerkip, Scot. Imported and exhibited by Andrew Aitchison, Guelph, Ont.; sire, Elator (10340); dam, Bell of Berfern (16938), by Woodside Prince (4116).

Clydesdale Mares, Foaled in 1904.

1st—Fifeshire Lass (imp.) [9581] (Vol. 29. S.), bay, face and legs white, foaled June, 1904. Bred by And. Dykes, West Finglassie, Fifeshire, Scot. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, Time Enough [6293] (11971); dam, Jubilee Queen [9582] (Vol. 29, S.), by Mains of Airies [2865] (10379).

2nd—Silver Queen (imp.) [9579] (Vol. 27. S.), bay, white mark on face, fore feet and hind legs white, foaled June 2, 1904. Bred by Robt. Paterson, Hill of Drip, Stirling, Scot. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, Royal Favorite [4052] (10630); dam, Peggy of Hill of Drip [9578] (15733), by Baron's Pride [3067] (9122).

3rd—Fashion's Gem (imp.) [9722] (Vol. 29, S.), brown, white on face, hind ankles legs white, foaled June 16, 1904. Bred by Wm. Blamire, Burgh-le-Sands, Carlisle, England. Imported and exhibited by T. H. Hassard, Millbrook, Ont.; sire, Baron's Fashion [6247] (10973); dam, Crosby Belle 2nd, by Knight of Drumlanrig [6361] (9777).

4th—Miss Pattinson (imp.) [10000] (Vol. 29, S.), bay, stripe, near fore and hind legs white, foaled 1904. Bred by Jno. Pattinson, Broomfield, Hall, Carlisle, Eng. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Lord Londonderry [6162] (10585); dam, Mourner, by Farmer's Profit [6367] (9207).

5th—Lady Dick (imp.) [9989] (Vol. 29, S.), bay, white hairs, face and hind legs white, foaled May, 1904. Bred by Jas. Dick, Ballinton, Kippen, Scot. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Marmion [5466] (11429); dam, Sally [9991] (Vol. 29, S.), by Mercury [6469] (9614).

6th—Lady Barclay (imp.) [8591] (Vol. 29, S.), light brown, white face and four white legs, foaled July 6, 1904. Bred by Patrick Barclay, Manorleys, Lochgelly, Scot. Exhibited by Walter Leonard, Craigvale, Ont.; sire, Sir Simon [5406] (10465); dam, Love [8589] (Vol. 29 S.), by Knight of Ellerslie (3737).

Clydesdale Mares, Foaled on or Subsequent to Jan. 1st, 1905.

1st—Queen's Maid (imp.) [9580] (Vol. 28, S.), brown, face and underlip white, white mark on front of off fore leg, hind legs white, foaled June 7, 1905. Bred by Robt. Paterson, Hill of Drip, Stirling, Scot. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, Royal Favorite [4052] (10630); dam, Peggy of Hill of Drip [9578] (15733), by Baron's Pride [3067] (9122).

2nd—Heather Bell (imp.) [10027] (Vol. 29, S.), brown, white mark on face, near fetlock and hind legs white, foaled June 10, 1905. Bred by Hugh Maclean, Locherbie, Scot. Imported and exhibited by And. Aitchison, Guelph, Ont.; sire, Ascot (10494) dam, Daisy (Vol. 29, S.), by Gold Mine (9540).

3rd—Fanny of Greenfield (imp.) [9119] (Vol. 29 S.), dark brown, stripe, near fore and both hind feet white, foaled May 7, 1906. Bred by Wm. Coulthard, Greenfield, Scot. Imported and exhibited by Thos. Mercer, Markdale, Ont.; sire, Royal Citizen [5374] (11896); dam, Jean [6147] (Vol. 27, S.), by Belted Prince [4752] (8459).

4th—Darkie of Culton (imp.) [9998] (Vol. 29, S.), black, stripe, near hind leg white, foaled 1905. Bred by Jno. Blamire, Culton Grange, Cumberland, Eng. Imported and exhibited by Jno. A. Boag & Son, Ravenshoe, Ont.; sire, Gartly Brand [6475] (12159); dam, Gavina McCamon [9999] (Vol. 29, S.), by McCamon (3818).

5th—Longburgh Lass (imp.) [10703] (Vol. 30, S.), bay, with grey hairs, foaled April 20th, 1905. Bred by Robt. Reay, Went End Farm, Carlisle, Eng. Imported and exhibited by Thos. Mercer, Markdale, Ont.: sire, Picador [5780] (10833); dam, Fancy of Longburgh [10709] (14481), by Lord Lothian [3513] (5998).

Canadian Bred Clydesdale and Shire Stallions, Foaled previous to Jan. 1st, 1905.

1st—Prince of Gladden [6222], bay, stripe, white legs, foaled May 19, 1904. Bred by Jno. Lawrie, Malvern, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Hopewell (imp.) [3377] (11375); dam, Bounce [3879], by Prince of Blantyre [2239].

2nd—Bold Archer [5477], bay, face and legs white, foaled July 29, 1903. Bred by S. A. Devitt, Cadmus, Ont. Exhibited by Smith & Richardson. Columbus, Ont.; sire, The Archer (imp.) [1259] (4951); dam, Lady May [1618], by Royal Lawrence (imp.) [1259] (4951).

3rd—Royal Prince [3802], bay, narrow stripe, hind legs white, foaled May 28, 1901. Bred by Jno. D. Morrison, Argyle, Ont. Exhibited by Hodgkinson & Tisdale, Beaverton, Ont.; sire, The Royal Standard (imp.) [2220] (10014); dam, Highland Queen [2576], by Mariner (imp.) [718] (6073).

4th—Golden Conqueror [4251], chestnut, white face and feet, foaled July 27, 1902. Bred by A. Doherty, Ellesmere, Ont.; exhibited by Jos. E. Teeson, Thornhill, Ont.; sire, Cloth of Gold [2959] (8962); dam, Daisy Belle [2596], by Bruce (imp.) [1595] (8496).

5th—Sir William Walter [6220], dark bay, stripe, four white feet, foaled May 8, 1904. Bred and exhibited by A. E. Frisby, O'Sullivan's Corners, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Lady Walter [3919], by Lord Walter (imp.) [1033] (4543).

6th—Lavender's Best [6320], dark bay, stripe, hind feet white, foaled June 10, 1904. Bred by Wm. D. Beath, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375] (11394); dam, Lakeview Kate [9668], by Lawers Baron Gordon (imp.) [1005] (5136).

7th—Balmanno Pride Prince [5798], bay, white stripe on face, off front foot little white, hind legs white, foaled July, 1903. Bred and exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Dandy B. (Vol. 15), by Lyon Macgregor (imp.) [2308].

Canadian Bred Clydesdale and Shire Stallions, Foaled on or Subsequent to January 1st, 1905.

1st—Scottish Commander [5485], light bay, face, off fore pastern and three legs white, foaled July 4, 1905. Bred and exhibited by Geo. Clayton, Peepabun, Ont.; sire, Scottish Celt (imp.) [2749] (10007); dam, Fan Borthwick [5263], by Lord Borthwick (imp.) [442] (4513).

2nd—Baron Charming [5784], bay, stripe, near fore and both hind legs white, foaled May, 1905. Bred and exhibited by O. Sorby, Guelph, Ont.; sire, Elator (imp.) [5080] (10340); dam, Miss Charming [2605], by Lord Charming [2264].

3rd—Nelson Foremost [5636], dark brown, stripe, hind ankles white, foaled April 21, 1905. Bred and exhibited by R. B. Cowie, Derryville, Ont.; sire, Foremost (imp) [3364] (11339); dam, Derryville Beauty [8360], by Carstairs (imp.) [1277] (3490).

4th—Earl Macqueen [8115], bay, foaled May 28, 1905. Bred and exhibited by David Pilkey, Balsam, Ont.; sire, Macqueen (imp.) [462] (5200); dam, Dolly Minty [8114], by Sir Arthur (imp.) [1371] (6292).

Canadian Bred Clydesdale and Shire Mares, Foaled Previous to Jan. 1st, 1904.

1st—Minnie of Amber [4779], bay, stripe, near forefoot and near leg white, foaled June 20th, 1901. Bred by S. Wilcox, Thornhill, Ont. Exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Janitor (imp.) [2433] (10206); dam, Peggy Richmond [4170], by Richmond (imp.) [338] (4666).

2nd—Balmanno Kate [4778], bay, small stripe, near fore and both hind feet white, foaled May 26, 1902. Bred by W. Cummer, Dollar, Ont. Exhibited by W. J. Howard & Sons, Amber, Ont.; sire, Balmanno (imp.) [3703] (10676); dam, Jennie Shier [4782], by British Commander (imp.) [864].

Canadian Bred Clydesdale and Shire Mares, Foaled in 1904.

1st—Lady Lavender [10061], bay, foaled May 15th, 1904. Bred by S. Bond. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375]; dam, Doll [10063], by Portland (imp.) [3189].

2nd—Miss Lavender [7299], bay, stripe, fore feet white, foaled June 12, 1904. Bred by Fred Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Lavender (imp.) [3375] (11394), dam, Belle McGregor [4851], by Sir Erskine (imp.) [2119] (8253).

Canadian Bred Clydesdale and Shire Mares, Foaled on or Subsequent to Jan. 1st, 1905.

1st—Blair Gowrie Lass [9062], bay, stripe, foaled June 20, 1905. Bred by Fred. Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Michaboe (imp.) [4256] (11434), dam, Blair Gowrie 2nd [3320], by New Day (imp.) [1912] (8076).

2nd—Mysie [9063], dark bay, stripe, hind legs white, foaled July 15, 1905. Bred by Fred. Richardson, Columbus, Ont. Exhibited by Smith & Richardson, Columbus, Ont.; sire, Prince of Scotlandwell (imp.) [4257] (11860); dam, Lady Sally (imp.) [4774], by The Dean [4033] (10937).

Shire Stallions, Foaled Previous to Jan. 1st, 1904.

1st—Berrywood Drayman (imp.) [Vol. 2] (22107), bay, blaze, white hind legs, foaled 1902. Bred by W. and S. Spokes, Upton Lodge, Northampton, Eng. Exhibited by Thos. Skinner, Mitchell, Ont.; sire, Iceland (16734); dam, Berrywood Smiler (27520), by Carlton Valiant (9073).

2nd—Ranging Duke (imp.) [491] (21784), bay, blaze, white hind legs to hocks, foaled 1899. Bred by Joseph Waltho, Newborough, Eng. Exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Ridware Ranger (12155); dam, Smiler (43319), by Duke of Cambridge 2nd (3607).

3rd—Grimsargh Admiral (imp.) (22408), brown, foaled 1902. Bred by Geo. Corless, Park Head, Barton, Preston, Eng. Exhibited by J. B. Hogate, Weston, Ont.; sire, Gunthorpe Advance (13136); dam Madge (32999), by Stroxton Tom (15871).

4th—Merrie Andrew (imp.) [415] (18208), chestnut, foaled 1898. Bred by Andrew Dale, Cheddleton, Leek, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Harold (3703); dam, Princess Mary (Vol. 16, E.), by King William 3rd (6019).

5th—General Buller (imp.) [416] (18753), bay white blaze, white near hind pasterns, foaled 1899. Bred by A. James, Ruddington, Nottingham, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Ruddington Lord Chancellor (14259); dam, Heath Queen (12503), by Duke of Normandy (4359).

6th—Scarcliffe Pilot (imp.) [417] (21845), bay, white legs, foaled 1901. Bred by Jno. Burton, Kedleston, Derby, Eng. Imported and exhibited by Joseph Jacobs, Peterborough, Ont.; sire, Saxon Pilot (16383); dam, Markeaton Belle (18549), by Lincolnshire Boy (3188).

Shire Stallions, Foaled in 1904.

1st—Birdsall King (imp.) [478] (Vol. 28 E.), black, face and legs white, foaled 1904. Bred by Geo. Hill, Birdsall, York, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Birdsall Caliph (21128); dam, Violet (43670), by Grafton 2nd (13120).

2nd—Admiral Togo [399] dark bay, stripe in face, hind legs white, foaled 1904. Bred by Morris & Wellington, Fonthill, Ont. Exhibited by John Gardhouse & Sons, Highfield, Ont.; sire, Mars (imp.) [275] (17103); dam, Moulton Mariana (imp.) [164], by Lockinge Harold (16779).

3rd—Whitewall Prince (imp.) [459] (22954), bay, white mark down face, white socks, except near fore leg, foaled 1904. Bred by Alfred A. Haley, Whitewall, Malton, Eng. Imported and exhibited by Thos. Irving, Winchester, Ont.; sire, King 3rd (19737); dam, Whitewall Daisy (46816), by Northwood (4593).

Shire Stallions, Foaled in 1905.

1st—Sir Ralph de Willington [465], bay, stripe, near fore foot white, foaled 1905. Bred by Morris & Wellington, Fonthill, Ont. Exhibited by T. D. Elliott, Bolton.; sire, Mars (imp.) [275] (17103); dam, Moulton Mariana (imp.) [164] (Vol. 24, E.), by Lockinge Harold (16779).

Shire Mares, Foaled on or Subsequent to Jan. 1st, 1904.

1st—Holdenby Nicausis (imp.) [276] (Vol. 28, E.), brown, white star, white hairs on nose and lip, both hind socks white, foaled 1904. Bred by Jno. Chambers & Sons, Holdenby, Northampton, Eng. Exhibited by J. Gardhouse & Sons, Highfield, Ont.; sire, Northgate Prince (15762); dam, Nicausis (33270), by Vulcan of Worsley 5th (12601).

Hackney Stallions 15 hands, 2 inches and over, Foaled Previous to January 1st, 1904.

1st—Baltimore (imp.)—332—(8729), Chestnut, stripe on face, four white legs, foaled 1903. Bred by T. D. Reed, Driffield, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Rosador (4964); dam, (6454) Calamine, by Lord Cave (2551).

2nd—Colorito (imp.)—333—(8796), chestnut, foaled 1902. Bred by H. G. Stacey Leeds, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Rosador (4964); dam, (11525) Syringa, by Agility (2799).

3rd—Scotch Hazel (imp.)—373—(9875), bay, foaled 1903. Bred by Jno. Iles, Dennick, King's Lynn, Norfolk, Eng. Imported and exhibited by O. Sorby, Guelph, Ont.; sire, Dairyman John (7769); dam, (10700) Bit o' Fashion, by Lord Donaghue (3743).

4th—Samuel Smiles (imp.)—303—(9005), chestnut, small star, white fore fetlocks, foaled 1902. Bred Jno. Beal, Blanch, North Dalton, Hull, Eng. Exhibited by J. B. Hogate, Weston, Ont.; sire, Blanch Squire (7711); dam, (15634) Blanch Primrose.

5th—Linden Renown (imp.)—331—(8545), bay, near hind foot white, foaled 1901. Bred by executors of late Thos. Wing, March, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Danegelt's son (6326); dam, (6109) Rosy Pink, by Renown (1887).

6th—British Yeoman (imp.)—251—(8085), dark brown, white near hind fetlock, foaled in 1900. Bred by Wm. Martin, Scoreby Grange, Yorkshire, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Pilot 2nd (3864); dam, (1040) Brown Bess.

7th—Gay Falconer (imp.)—347—(8859), chestnut, blaze, white near hind fetlock, foaled 1902. Bred by J. W. Simpson, Bootle, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Unique (4052); dam, (6416) Blush Rose, by Falcon (2470).

Hackney Stallions, Under 15 hands, 2 in., Foaled Previous to January 1st, 1904

1st—Dalton King (imp.)—338—(9592), bay, foaled 1901. Bred by Thos. Binnington, North Dalton, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009) dam, (5790) May Queen.

2nd—Moordale Duke (imp.)— —(8955), chestnut, star, white fetlocks, foaled 1903. Bred by Edward Hollingworth, Moordale, Dobeross, Eng. Exhibited by W. H. Nichols, Hamilton, Ont.; sire, Garton Duke of Connaught (3009); dam, (9975) Gay Duchess, by Danegelt (174).

3rd—Terrington Activity (imp.)—Vol. 2—(9036), bay, foaled 1903. Bred by Sir Gilbert Greenall, Walton Hall, Warrington, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Lord Drewton 2nd (6817); dam, (13963) Terrington Accident, by Goldfinder 6th (1791).

4th—Forest Fashion (imp.)—344—(9228), brown, star and snip, four white fetlocks, foaled 1903. Bred by Wm. Rennison, Skiff Farm, Holme-on-Spalding, Yorks, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Copley Gany (7028); dam, (15436) Skiff Nancy, by Forest King (5621).

5th—Tregarthon (imp.)—309—(8683), chestnut, foaled 1902. Bred by Alfred A. Haley, Whitewall, Malton, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009); dam, (6346) Actress, by Danegelt (174).

6th—Blanch Surprise (imp.)—368—(8745), dark chestnut, white face, four white legs, foaled 1903. Bred by Jno. Beal, North Dalton, Driffield, Eng. Imported and exhibited by John A. Boag & Son, Ravenshoe, Ont.; sire, Rosador (4964); dam, (15634) Blanch Primrose, by Garton Duke of Connaught (3009).

7th—Sharplow (imp.)—359—(6557), brown, foaled in 1897. Bred by Sir Gilbert Greenall, Walton Hall, Eng. Exhibited by J. Gordon McPherson, V.S., Toronto; sire, Sir Horace (5402); dam, (3852) Georgina 3rd, by Sir George (778).

Hackney Stallions, Foaled in 1904.

1st—Crayke Mikado (imp.)—334—(9176), bay, star, white near fore fetlock, foaled 1904. Bred by Stephen Cliff, Western Flatts, Wortley, Leeds, Eng. Exhibited by Graham Bros., Claremont, Ont.; sire, Garton Duke of Connaught (3009); dam, (13533) Halsham Topsy, by Lord Derby 2nd (417).

2nd—King's Chocolate (imp.)—342—(9291), bay, litttle white on face, foaled 1904. Bred by T. & C. Ross, The Limes, Hedon, Hull, Eng. Imported and exhibited by Hamilton & Hawthorne, Simcoe, Ont.; sire, Chocolate Jr. (4185); dam, (10023) Her Majesty, by His Majesty (2513).

3rd—Terrington Cleophas (imp.)—335—(9460), chestnut, foaled 1904. Bred by Sir Gilbert Greenall, Walton Hall, Eng. Imported and exhibited by Graham Bros., Claremont, Ont.; sire, Clifton 3rd (6689); dam, (13980) Terrington Rachel, by Gentleman John (3624).

4th—Cedar Conquest (imp.)—349—(9155), chestnut, white face, white fore pasterns and hind legs, foaled 1904. Bred by Geo. Wilson, Cedar House, Garton, Driffield, Eng. Exhibited by T. H. Hassard, Millbrook, Ont.; sire, Conquest 2nd (5560); dam, (14216) Cedar Primrose, by Revival (7236).

Standard Bred Stallions, Trotters or Pacers, Foaled Previous to Jan. 1st, 1904. Conformation, Style of Travelling or gaits, breeding and Record to be specially considered.

1st—Arley A. 36329, bay, foaled 1900. Exhibited by Crow & Murray, Toronto; sire, Westbrook, 7501; dam, Jenny McGregor, by McGregor Boy, 2696.

2nd—Fritz Bingen, 37553, black, 15.2, foaled in 1901. Bred by J. Malcolm Forbes, Boston, Mass. Exhibited by Hugh Scott, Toronto; sire, Bingen, 79567; dam, Javotte, by Wilton, 5982.

Standard Bred Stallions, Trotters, Foaled Previous to Jan. 1st, 1904. Type and Build to Produce Carriage Horses, Carriage Horse conformation and gaits to be specially considered.

1st—Rex Edward, 40305, bay, foaled 1901. Exhibited by S. J. Patterson, Warkworth, Ont.; sire, Red Shawmut, 18247; dam, Helen Dean, by Pilot Medium, 1597.
2nd—Arley A. 36329, bay, foaled 1900. Exhibited by Crow & Murray, Toronto; sire, Westbrook, 7501; dam, Jenny McGregor, by McGregor Boy, 2696.
3rd—The Roman, 812, bay, foaled 1897. Exhibited by Paterson Bros., Coleman, Ont.; sire, Budd H., 676; dam, Charlotte S., by Oriole, 2297.

Thoroughbred Stallions, Foaled Previous to Jan. 1st, 1904.

1st—Cricklade, 368 (363), bay, foaled 1902. Exhibited by Crow & Murray, Toronto; sire, Lados; dam, Craig Crook, by Foxhall.
2nd—Kapanga Horse, chestnut, aged. Exhibited by Dr. Andrew Smith, Toronto; sire, Spendthrift (imp.); dam, Kapanga (imp.).

Thoroughbred Stallions, Foaled Previous to Jan. 1st, 1904. Type and Conformation to Produce Saddle and Hunting Horses to be specially considered.

1st—Halfling (imp.) (172), brown, foaled 1892. Exhibited by Thos. G. Paterson, Coleman, Ont.; sire, Macheath; dam Moiety, by Charibert.
2nd—Ben Carrick, 21093, golden bay, foaled 1899. Bred by George Headly, New York. Exhibited by Allan Kemp, Oakville; sire, Ben Strome; dam, Hanoletta.
3rd—Gold Car, chestnut, foaled 1898. Bred by J. B. Haggin. Exhibited by Cheyne & Armstrong, Derry West, Ont.; sire, Goldfinch (imp.); dam, Carina.
4th—Procession, bay, 16.1, foaled 1896. Exhibited by Wm. McKay, Doncaster, Ont.; sire, Order; dam, Triumph.
5th—Andy Williams, brown, foaled 1899. Exhibited by Chas. Verral, Toronto; sire, Kingstock; dam, Carmencita.

Thoroughbred Stallions, Foaled on or Subsequent to January 1st, 1904.

1st—Kelvin, 40018, brown, star in forehead, four white ankles, foaled April 27, 1904. Exhibited by T. Ambrose Woods, Toronto; sire Martinmas; dam, Nancy Lee.

Shetland Pony Stallions, any age.

1st—Goldfinder—Vol. 10—. Exhibited by F. Gillies, Toronto.
2nd—Lord Minto—5275—, Brown, foaled July 7, 1903. Bred by George Cassie Exhibited by F. D. Elliot, Toronto, sire, Vermont Dewey—5269—; dam, Nina—2700.

Shetland Pony Mares, any age.

1st—Nepsie, bay. Exhibited by Alfred Rogers, Deer Park.
2nd—Dolly, black. Exhibited by Langton Bros., Toronto.
3rd—Balmanno Queen—Vol. 15—. Exhibited by F. Gillies, Toronto.

Pony Stallions, any age, any breed other than Shetland, 14 hands, 1 inch and under.

1st—Sparks, bay. Exhibited by Graham Bros., Claremont, Ont.
2nd—Sharplow (imp.)—359—(6557). Exhibited by J. Gordon McPherson, V.S., Toronto.

Pony Mares, any age, any breed other than Shetland, 14 hands, 1 inch and under

1st—Lady Grey, grey, foaled 1900. Exhibited by H. M. Robinson, Toronto; sire, Royal Standard (imp.) —55— (3918).
2nd—Minnie, grey, foaled 1897. Exhibited by Sam Groves, Toronto.

Heavy Draught Geldings, or Mares, Shown in Harness, three years old and over, to be sired by either a Registered Clydesdale or Shire Stallion. Name and number of sire to be given with entry. Animals competing in other classes not eligible.

1st—Bobby Burns, bay gelding, 16.2, 7 years. Exhibited by the Dominion Transport Co., Toronto; sire, Macarlie [2464].
2nd—Sport, bay gelding, 16.3, 7 years. Exhibited by the Dominion Transport Co., Toronto; sire, Lord Charming [2264].

3rd—Charlie, bay gelding, 16.3, 6 years. Exhibited by the Dominion Transport Co., Toronto; sire, Royal Huntly (imp.) [2432].

4th—Tom, bay gelding. Exhibited by Jos. Russell, Toronto; sire, Baron Burgie, (imp.) [2723].

5th—Farmer, brown gelding. Exhibited by Jos. Russell, Toronto; sire, Baron Burgie (imp.) [2723].

6th—Prince Arthur, bay gelding, 16.2, 6 years. Exhibited by the Dominion Transport Co., Toronto; sire, Montrave Chief (imp.) [537].

Heavy Draught Team, in harness, geldings or mares, to be sired by a Registered Clydesdale or Shire. Name and number of sire to be given with entry.

1st—Bobby Burns, bay gelding, 16.2, 7 years; sire, Macarlie [2464]. Sport, bay gelding, 16.3, 7 years; sire, Lord Charming [2264]. Exhibited by the Dominion Transport Co., Toronto.

2nd—Bob, bay gelding; sire, Granite [1913]. Gamey, bay gelding; sire, Sir Arthur (imp.) [3154] (10455). Exhibited by Smith & Richardson, Columbus, Ont.

3rd—Charlie, bay gelding, 16.3, 6 years; sire, Royal Huntly (imp.) [2432].

Prince Arthur, bay gelding, 16.2, 6 years; sire, Montrave Chief (imp.) [537]. Exhibited by the Dominion Tranpsort Co., Toronto.

4th—Farmer, brown gelding; sire, Baron Burgie (imp.) [2723].

Tom, bay gelding; sire, Baron Burgie (imp.) [2723]. Exhibited by Jos. Russell, Toronto.

CHAMPIONSHIPS.

Clydesdale Stallion, any age.

1st—Baron Richardson (imp.) [5320] (12842). Exhibited by Smith & Richardson, Columbus.

Clydesdale Mare, any age.

1st—Fifeshire Lass (imp.) [9581] (Vol. 29, S.). Exhibited by Hodgkinson & Tisdale, Beaverton.

Shire Stallion, any age.

1st—Birdsall King (imp). [478] (Vol. 28, E.). Exhibited by Hamilton & Hawthorne, Simcoe, Ont.

Shire Mare, any age.

1st—Holdenby Nicausis (imp.) [276] (Vol. 28, E.). Exhibited by J. Gardhouse & Sons, Highfield, Ont.

Hackney Stallion, any age.

1st—Dalton King (imp.)—338—(9592). Exhibited by Graham Bros., Claremont, Ont.

Standard Bred Stallion, any age.

1st—Rex Edward, 40305. Exhibited by S. J. Patterson, Warkworth, Ont.

Thoroughbred stallion, any age.

1st—Halfling (imp.) (172). Exhibited by Thos. G. Paterson, Coleman, Ont.

Pony Stallion, any age.

1st—Sparks, bay. Exhibited by Graham Bros., Claremont, Ont.

Pony Mare, any age.

1st—Lady Grey, grey. Exhibited by H. M. Robinson, Toronto.

SPRING STALLION SHOWS, 1906.

Renfrew Spring Stallion Show, April 24.

Under the auspices of the Renfrew Agricultural Society.

Secretary,—W. E. Smallfield, Renfrew; total receipts, $32.40; total expenditure, $31.08; 20 horses on exhibition, all but 2 or 3 of which were registered. No prizes were offered, but a handsome badge was given to each entry.

Huron County Spring Stock Exhibition, April 5.

Secretary, J. W. Shaw, M.D., Clinton; total receipts, $440; total expenditure, $411; entries, stallions, 23; other horses, 66; total, 89; prizes offered, $354. Prizes paid, stallions, $94; other horses, $95; other stock, $150; total paid, $339. Printed regulations require all stallions to be registered.

Township of Erin Spring Horse Show, April 20.

Show held at Hillsburg.

Secretary, Peter McGill, Erin; total receipts, $281.78; total expenditure, $223.85; entries, stallions, 14; other horses, 56; total 70. Prizes offered, $246.00; prizes paid, stallions, $86; other classes, $100; total $186. Owners were required to produce registration certificates of stallions at the time of entry.

Chatham Spring Stallion Show, April 29.

Under the auspices of the West Kent Agricultural Society.

Secretary, A. H. White, Chatham; total receipts, $89.15; total expenditure, $28; entries, 31. The prizes consisted of ribbons, together with sweepstakes of $5 for best heavy horse and $5 for best light horse. Prizes were offered for registered horses.

Kenilworth Spring Horse Show, April 17.

Secretary.—Geo. Cushing, Kenilworth; total receipts, $205.15; total expenditure, $150.10; prizes offered, $179.00; prizes paid, stallions, $39; other horses, $55; other stock, $21; total, $115. Most of the stallions shown were registered.

Elmira Spring Horse Show, April 19.

Held under the auspices of the Woolwich Agricultural Society.

Secretary, Harry W. Zilliax, Elmira; total receipts, $122.75; total expenditure, $122.25; entries, stallions, 18; other horses, 15; total, 33. Prizes offered, stallions, $90; other horses, $30; total, $120; prizes paid, $106. Winning stallions were pure-bred.

Tara Spring Show, April 20.

Secretary, Neil McDougall, Tara; total receipts, $158.80; total expenditure, $117.35; entries, 20; prizes offered, $88. Prizes paid, stallions, $62; other horses, $18; total $80.

Guelph Spring Stallion Show, April 18.

Under the auspices of the South Wellington Agricultural Society.

Secretary, Wm. Laidlaw, Guelph; total receipts, $291.10; total expenditure, $234.80; entries, 42; prizes offered, $190; prizes paid, stallions, $106; other horses, $62; total $168. All stock was registered.

Palmerston Spring Stallion Show, April 10.

Secretary, R. J. Smith, Palmerston; total receipts, $101.75; total expenditure, $107.50; entries, 26; amount of prizes offered, $119. Prizes paid, stallions, $67; other horses, $26; total $93. All stallions were registered.

Malton Spring Show, April 13.

Malton Stock Breeders' Association.

Secretary, Albert Hewson, Grahamsville; receipts, $149.75; expenditure $136.50; entries, 54; prizes offered, $123; prizes paid, $108. Unregistered stallions not barred from exhibiting.

South Lanark Horse Show.

Held at Perth, under the auspices of the South Lanark Agricultural Society.

Secretary, J. A. Kerr, Perth; Date, May 1st; prizes offered, stallions $40; other horses, $75; total $115: prizes paid, stallions, $30; other horses, $62· total $92.

Owen Sound Spring Horse Show, April 18.

Under the auspices of the North Grey Agricultural Society.

Secretary, John McQuaker, Owen Sound; gate receipts, $27.05; expenditures in addition to prize money, $10.00; entries, 22; prizes offered, $85.00; prizes paid, $85.00. All exhibitors were required to supply the judge with a certificate of registration.

Seaforth Spring Stock Show.

Under the auspices of the South Huron Agricultural Society.

Secretary, M. Y. McLean, Seaforth; Date, April 24th; gate receipts, $19.00; general expenses, $12.80; entries, 25; prizes paid, horses, $96; other stock, $37; total $133.00.

Regulation 5 of the rules and regulations is as follows: "Certificates of herd book pedigrees of pure bred bulls and thoroughbred horses must be lodged with the Secretary at the time of making entry."

In judging the horses there is no competition; all entries were inspected and any horses that passed inspection were paid a premium of $4; the object of the exhibition being to get the horses together so as to allow any person interested to make comparisons and selection.

Carleton Place Horse Show, April 25.

Secretary, J. J. McGregor, V.S., Carleton place; date, April 25th; total receipts, $558.00; expenditure, in addition to prize money, $244.75; prizes paid, $110; prizes offered, stallions, $120; other horses, $153; total $273.

Cannington Horse Show, May 24.

Secretary,G. H. Woodward, Cannington; prizes offered, stallions, $45; other classes, $238; total, $283. No. of stallions entered, 5; prizes paid, stallions, $30; other classes, $233; total receipts, $327.80; total expenditure, $337.80.

Elora Entire Horse Show, April 20.

Secretary,—R. J. McQueen, Elora; receipts, collected to time of report, $204.25; expenditure, $152.75; prizes offered, $146.00; prizes paid, $139.00. All stallions with the exception of road horses were registered.

Drayton Entire Horse Show.

Secretary, Geo. M. Fox, Drayton; date, April 12th; entries, stallions, 19; other horses, 23; total 42. Prizes offered, $166.00; prizes paid, stallions, $110; other horses, $46; total $156.00; receipts, $168.00; expenditure, 171.78. All horses were registered, and the names and numbers supplied in all but one or two cases.

St. Thomas Horse Show Association, Sept. 16.

Secretary, M. Scarth Stevenson, St. Thomas; amount offered for stallions, $50.00; amount offered for other horses, $353.00.

Township of Collingwood Agricultural Society Spring Horse Show, April 27.

Secretary, Chas. Pye, Clarksburg; expenditures, $26; entries, 6; prizes offered, $25; prizes paid, $16.

SPRING STALLION SHOWS, 1907.

Held by Societies other than Agricultural Societies.

Huron County Spring Stock Show, April 12th.

Show held at Clinton. Secretary, J. W. Shaw, M.D., Clinton. Total receipts, $499.53; total expenditures, $375.22. Prizes paid, horses, $170; other classes, $61; total paid, $231.

Bright Spring Show, April 12th.

Secretary, L. W. Craig, Bright. Total receipts, $92.00; total expenditures, $86.00. Prizes offered, $93.00; prizes paid, stallions, $48; other horses, $18; other stock, $11; total paid, $77

Sunnidale Spring Show, April 18th.

Secretary, John A. Bell, New Lowell. Total expenditures, $80.70. Prizes offered, $82.00; prizes paid, stallions, $55.00; other stock, $10.00; total paid, $65.00. All animals shown to be eligible for registration.

Malton Spring Show, April 5th.

Secretary, Albert Hewson, Grahamsville. Total receipts, $158.00; total expenditures, $112.00. Entries, stallions, 5; other horses, 33; other stock, 3; total entries, 41. Prizes offered, $142; prizes paid, stallions, $24; other classes of horses, $62; other stock, $8; total prizes paid, $94.

Carleton Place Horse Show, June 5th.

Secretary, B. S. Snyder. Carleton Place. Total receipts, $652.68; total expenditures, $376.36. Entries, stallions, 7; other stock, 170. Prizes offered, $392; prizes paid, $101, and $185 in specials.

Erin Spring Horse Show, April 18th.

Secretary, Peter McGill, Hillsburg. Total receipts, $331.78; total expenditures, $225.35. Entries, stallions, 14; other classes of horses, 79. Prizes offered, stallions, $132; other classes of horses, $113. Prizes paid, stallions, $99; other classes of horses, $109. Pedigrees of all stallions were required to be produced at time of entry.

Elora Entire Horse Show, April 12th.

Secretary, R. J. McQueen, Elora. Total receipts, $312.50; total expenditures, $217.35. Entries, stallions, 21; other horses, 24. Prizes offered, stallions, $188; other horses, $35. Prizes paid, stallions, $140; other horses, $31.

Drayton Entire Horse Show, April 11th.

Secretary, Geo. M. Fox, Drayton. Total receipts, $154; total expenditures, $175. Entries, 32. Prizes offered, $171; prizes paid, $158. One of the rules required that pedigrees of all stallions must be handed to the Secretary.

Cannington Horse Show, May 24th.

Secretary, G. H. Woodward, Cannington. Total receipts, $337.50; total expenditures, $375.10. Entries, stallions, 9; other horses, 41. Prizes offered, stallions, $45; other horses, $287. Prizes paid, stallions, $45; other horses, $254.

Palmerston Horse Show, April 12th.

Secretary, R. J. Smith, Palmerston Total receipts, $189.65; total expenditures, $157.40. Entries, stallions, 17; other horses, 16. Prizes offered, stallions, $103; other horses, $66. Prizes paid, stallions, $88; other horses, $51.

Kenilworth Spring Show, April 18th.

Secretary, Geo. Cushing, Kenilworth. Total receipts, $217.85; total expenditures, $162.50. Entries, stallions, 8; other horses, 50; other stock, 7. Prizes offered, stallions, $58; other horses, $103; other stock, $13. Prizes paid, stallions, $26; other horses, $95; other stock, $12.

Creemore Spring Show, April 23rd.

Secretary, A. H. Watson, Creemore. Total receipts, $114; total expenditures, $146 25. Entries, stallions, 8; other horses, 8; other stock, 11. Prizes offered, stallions, $40; other stock, $46. Prizes paid, stallions, $30; other stock, $46.

REPORTS OF LOCAL POULTRY ASSOCIATIONS.

The Cornwall Poultry Association.

This Association was organized on November 14th, 1906. The membership for 1906 was 97. The receipts were $313.75, and the expenditures $292.39. A poultry show was held February 6th to 9th, 1907, at Cornwall, at which $250 was offered in prizes, $202.75 of this amount being won. There were 516 entries, and 535 birds on exhibition, including turkeys, geese and ducks. The entry fee was 25 cents. Mr. L. G. Jarvis of Montreal acted as judge. The Association intends holding another Show in 1908, by which they expect to still further improve the quality of the poultry in that section. The officers of the Association are: President, Thos. Flanigan; Vice-President, James Snetsinger; Secretary-Treasurer, Chas. LaRose.

Lambton County Poultry Association.

The membership of this Association for 1907 is 43. Their first show was held at Inwood, January 29th to 31st, last, with entries numbering 390. Mr. Wm. McNeil was the judge. Their receipts for the year ending January, 1907, were $198.45, and expenditures, $198.44. The officers of the Association are: President, W. R. Dawson, Inwood; Vice-President, D. Hartley, Wyoming; Secretary-Treasurer, A. H. Graves, Inwood.

Owen Sound and County of Grey Poultry Association.

The present membership of the Association is 220. A Show was held at Owen Sound, January 14th to 18th, 1907. Entries numbered 725, and the judges were Joseph Bennett and D. C. Trent. $800 was offered in prizes. The officers of the Association are: President, H. Mosley; Vice-President, G. J. Somerville; Secretary-Treasurer, Robert R. Cameron.

Waterloo County Poultry Association.

The membership of this Association for 1907 is 35. A show was held at Berlin, November 8th, 9th and 10th, 1906, the entries numbering 615. Mr. Jos. Bennett and Mr. Wm. McNeil acted as judges. $191.50 was paid in prizes. The total receipts of the Association for the year ending February, 1907, were $537.20, and the total expenditures $490.14. The officers of the Association are: President, J. Hallman; Vice-President, H. J. Hurd; Secretary-Treasurer, J. A. Good, Berlin.

St. Thomas Poultry Association.

The 1907 membership of this Association is 33. A show was held January 10th to 12th, 1907, at which 510 birds were on exhibition. $141.25 was offered in regular prizes and $28.50 in special prizes. The judge was Richard Oke, London. The receipts of the Association amounted to $458.73, and the expenditures, $360.20. The officers of the Association for 1907 are: President, J. W. Roberts; Vice-President, T. H. Scott; Secretary-Treasurer, Wm. Cadman, St. Thomas.

Midland Poultry Association.

The membership of this Association in 1907 is 100. The last show was held February 8th, 9th and 10th, 1907, with 525 entries. The amount of cash prizes offered was $300, of which $233.75 was won. Mr. J. Bennett of Toronto acted as judge. Receipts were $405.44, and expenditures $363.90. The officers of the Association for 1907 are: President, John W. Benson; Vice-President, H. S. Ruby; Secretary-Treasurer, H. E. Macartney, Midland.

Meaford Poultry Association.

This Association was organized October 3rd, 1904, with the object of demonstrating the superiority of modern pure-breeding methods by holding a show each year. The fourth annual show was held January 2nd, 3rd and 4th, 1907, with 416 entries. $715 was offered in prizes, of which $252.04 was won. The judge was Mr. Newton Cosh. The membership of the Association for 1907 is 56. The receipts for the year ending December, 1906, are $328.29, and expenditures, $312.54. The officers of the Association are: President, Bryan Laycock; Vice-President, Wm. Croft; Secretary, E. S. Smith, Meaford.

Napanee Poultry Association.

The membership of this Association for 1907 is 44 The second annual winter show was held January 9th to 12th, 1907, entries numbering 499. The amount of cash offered in prizes was $335.50, of which $293.50 was won. The judge was L. G. Jarvis, Montreal. The total receipts for the year ending June 30th, 1907, were $478.50, and the total expenditures, $498.40. The officers for 1907 are: President, Herman Meng; Vice-President, Geo. Degroff; Secretary, Geo. T. Walters, Napanee.

Toronto Poultry, Pigeon and Pet Stock Association.

The present membership of this association is 98. The last show held was December 28th to 31st, 1906, and January 1st, 1907. There were 846 entries, and $247.61 was offered in prizes, all of which was won. The judges were J. E. Bennett, Wm. J. Wolfe and Wm. Barber. Receipts amounted to $718.22, and expenditures, $634.67. The officers are: President, J. E. Bennett; Vice-President, C. J. Mick; Secretary-Treasurer, Chester E. Sherlock, 7 Pearson Ave., Toronto.

Huron Poultry Association.

The membership of this Association for 1907 is 50. The eleventh annual show was held at Seaforth, January 20th to 23rd, 1907, at which there were 451 entries. F. Scott of St. Thomas acted as judge. $127.65 was paid in prize money. The total receipts for the year ending January 31st, 1907, were $225.20, and the total expenditures $256.04. The following are the officers for 1907: President, P. Dill; Vice-President, Wm. Hortry; Secretary-Treasurer, J. F. Daly, Seaforth.

Northern Ontario Poultry and Pet Stock Association.

The membership of this Association for 1907 is 30. The last show held by this Association was on November 29th and 30th, and December 1st, 1906, for which there were 230 entries. $500 was offered in prizes, and Messrs. Robert Coppey, Kingston, and Ernest A. Orr, Fort William, were judges The receipts for the year ending June 30th, 1907, were $279.45, and the expenditures $280.94. The officers are as follows for 1907: President, J. K. Ollis; Vice-President, John Bingham; Secretary-Treasurer, David Bell, Port Arthur.

Hespeler Poultry and Pet Stock Association.

The membership of this Association at present is 52. A show was held December 6th and 7th, 1906, for which there were 204 entries. The judge was Prof. W. R. Graham of Guelph. $27 was offered in prizes, and the total receipts were $110.30, and expenditures $75.23. The officers are: President, Thos. Traplin; Vice-President, W. A. Rife; Secretary, Geo. W. Tebbs, Hespeler; Treasurer, B. Thorne.

Brantford Poultry Association.

Membership for 1907 36. Show of 1907 was held January 11th to 13th, with 875 entries. $432 was offered in prizes, of which $281.50 was won. The judges were Wm. McNeil and J. Bogue. The total receipts were $627.47, and the total expenditures, $468.50. The following are the officers for 1907: President, S. Schelly; Vice-President, W. Furguson; Secretary-Treasurer, P. McNelles.

Ingersoll Poultry Association.

This Association was organized in 1888, with the object of furthering the poultry industry. The average membership for the past five years was 100, and the membership for 1907, 110. Five shows have been held, the last one being held December 18th, 19th and 20th, 1906. There were 315 entries and $357 offered in prize money. Mr. Wm. McNeil of London acted as judge. The total receipts according to the financial statement were $208.34, and expenditures $233.02. The following are the officers of the Association: President, H. W. Partlo; 1st Vice-President, R. B. Hutt; 2nd Vice-President, J. McDermaid; Secretary-Treasurer, F. J. Fisher, Ingersoll.

Hamilton and Wentworth Poultry Association.

There are 35 local members and 35 county members belonging to the above Association. A show was held December 1st to 6th, 1906, for which there were 860 entries made, and $475 offered in prize money. Messrs. Newton Cosh, Sharpe Butterfield and Chas. F. Wagner acted as judges. Owing to a street car strike being on at the time,

the show was not the success it would otherwise have been. The total receipts and expenditures for the year ending March 1st, 1907, were $564.60 and $559.39 respectively. The officers are as follows: President, G. G. Henderson; 1st Vice-President, J. Meldrum, 2nd Vice-President, W. J. Roberts; Secretary-Treasurer, J. E. Peart.

Lindsay Poultry and Pet Stock Association.

The membership of this Association for 1907 is 153. The show for the same year was held January 22nd to 24 inclusively. The entries numbered 792 and $750 was offered in prize money. Mr. D. C. Trew acted as judge. The total receipts were $615.43; expenditures $593.34. The officers are: President, Johnson Ellis; Vice-President, J. A. Williamson; Secretary-Treasurer, Crail A. Frost, Lindsay.

Kingston Poultry Association.

This Association was organized February 16th, 1906. The object of the Association is to advance the breeding of thoroughbred stock in Kingston, not only for show, but for general purposes. With this end in view they have different breeds at the semi-monthly meetings, to be scored and discussed. The average membership is 40, and the membership for 1907 is 45. The last show was held September 18th and 19th, 1907, with 229 entries. Ribbons were given for prizes. The judges were Col. R. E. Kent, G. S. Oldreive, and Geo. Nicol. The total receipts were $40, and total expenditures $37.80. The officers for 1907 are as follows: President, G. S. Oldreive; Vice-Presidents, W. H. Reid and P. D. Lyman; Secretary, R. M. Douglas; Treasurer, Thos. Ougston.

Leamington Poultry Association.

This Association was organized February 4th, 1907. The object of the Association is to improve and encourage the breeding of thoroughbred poultry. They have worked heretofore with the Mersea, Leamington and South Gosfield Agricultural Society, and a show was held in connection with this Society on October 2nd, 3rd and 4th, 1907, at which there were 347 entries and $196 offered in prize money. Mr. Sharpe Butterfield acted as judge. The membership of the Association for 1907 is 20. The total receipts show $20, and the total expenditures $15.75. The officers for 1907 are as follows: President, Lewis Smith; Vice-President, Arthur Harrington; Treasurer, James Hambley; Secretary, J. R. Johnson, Leamington.

Brockville Poultry and Pet Stock Association.

The membership of this Association in 1907 is 34. No show was held, but $9.50 was given in prizes for poultry at the Fall Fair. The receipts of the Association for 1906 were $44.75, and expenditures $19.75. They purpose holding a show in 1907. The officers are: President, W. M. Osborne; Vice-President, E. McDougall; Secretary-Treasurer, W. P. Carswell.

Guelph Poultry Association.

The membership for 1907 is 70. A local show is held every Thanksgiving day by this Association, there being 120 entries at the show of 1906. Silk ribbons are given for prizes and no admission fee is charged. Mr. R. Oke acted as judge. This Association also contributes to the special prize list in connection with the poultry department of the Winter Fair. The receipts of the Association for the year ending January, 1907, were $145.65, and expenditures $145.65. The officers are as follows: President W. R. Graham; Vice-President, Wm. Krouse; Secretary, W. A. McMaster; Treasurer, G. Pool.

London Poultry Association.

The membership of the Association for 1907 is 108. No show is held by this Association, but about $366 was donated to the special prize list of the Provincial Winter Fair in 1906. Receipts for 1906 show $499.03, and expenditures $424.15. The officers are: President, Wm. McNeil; Vice-President, C. H. McNeil; Secretary, R. Oke; Treasurer, J. H. Saunders.

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